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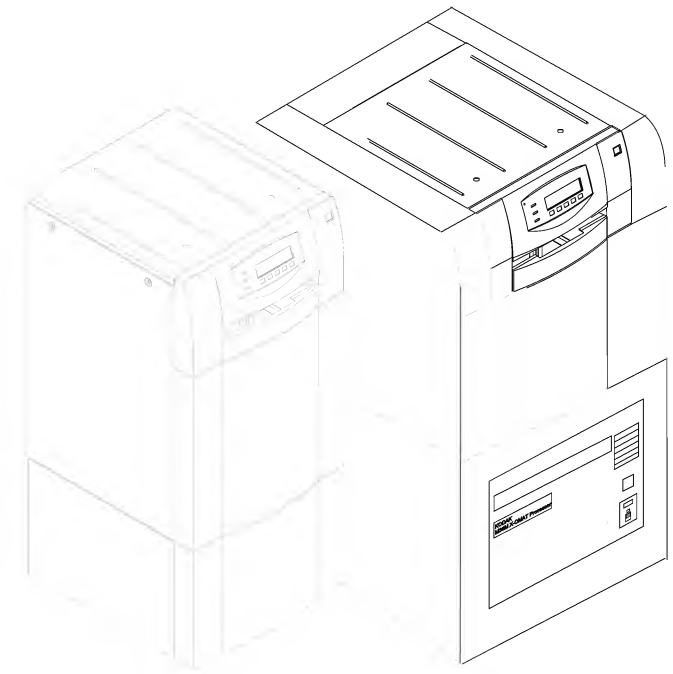
WIRING DIAGRAMS

for the

KODAK Miniloader 2000

and for the

KODAK Miniloader 2000 P



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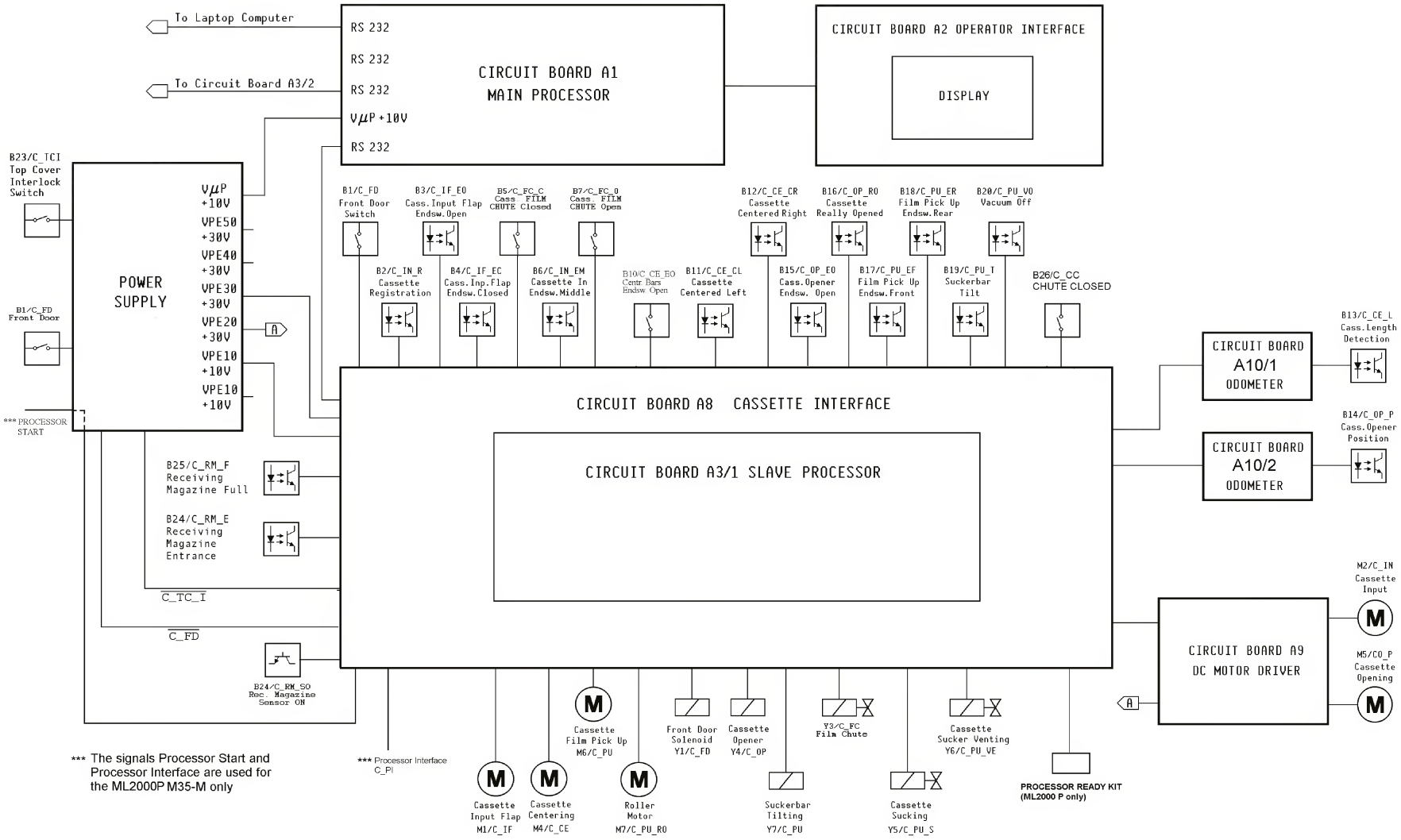
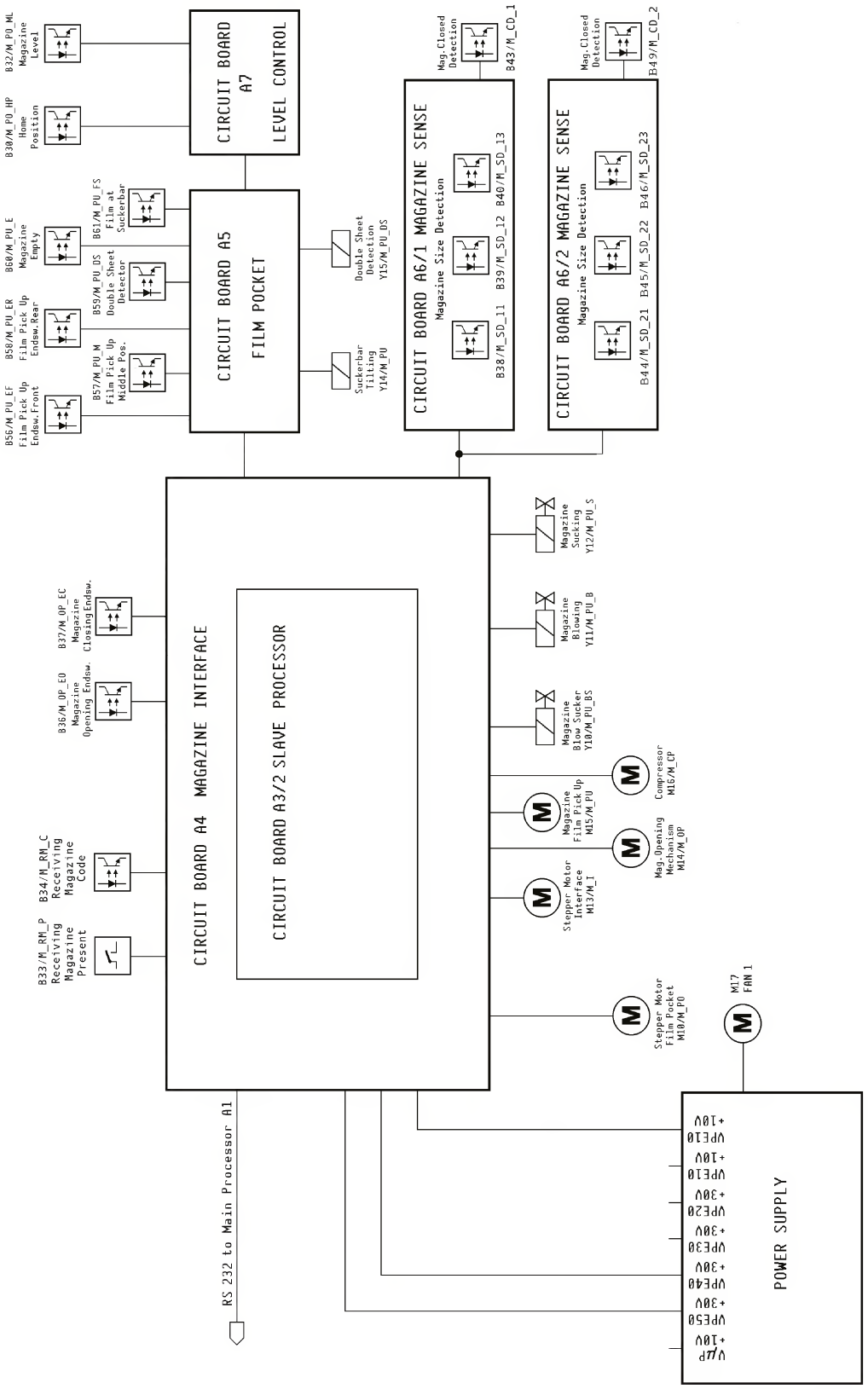
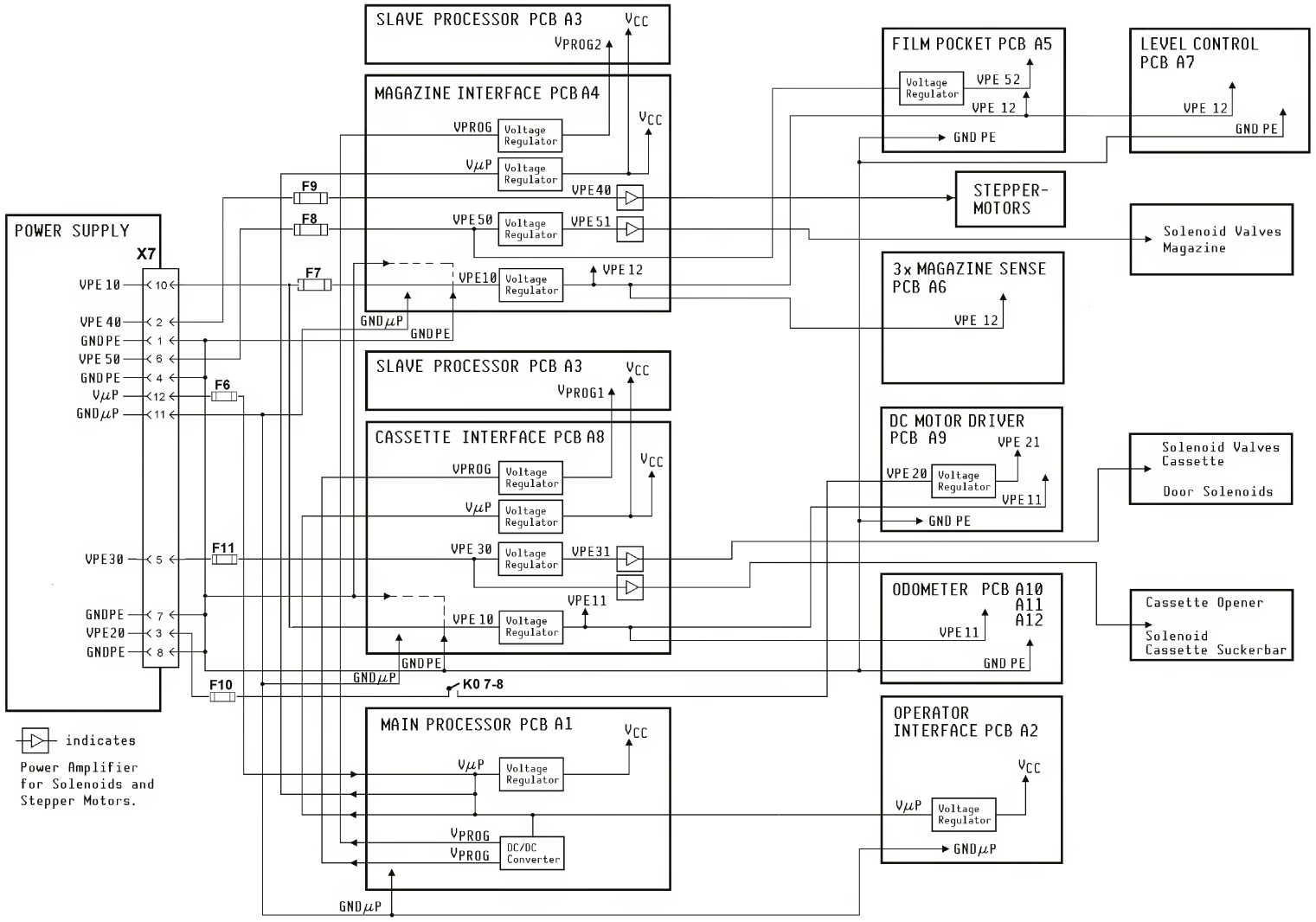
1. BLOCK DIAGRAMS



BLOCK DIAGRAM CASSETTE INTERFACE

BLOCK DIAGRAM MAGAZINE INTERFACE





BLOCK DIAGRAM LOW VOLTAGE DISTRIBUTION

2. CIRCUIT DIAGRAMS

SWITCH SETTING OF S1-1 ON PCB A1. S1-2 is not used.

S1-1

Normally S1-1 should be set to OFF (down). In this case some errors can only be reset with the LAP TOP.

If S1-1 is set to ON (up) the following options are enabled:

Caution

This RESET cannot solve a real hardware problem or a film jam when it tries to recover from the problem. In such a case the problem will occur again in the next cycle. This means an exposed FILM would become lost. For this reason set S1-1 only to ON if the CUSTOMER is aware of this risk and if he is willing to accept it.

1. The OPERATOR can reset the Miniloader 2000 after every malfunction just by pressing the left-hand BUTTON. He can then try to start another cycle.

2. After selecting "FUNCTION" on the OPERATOR CONTROL PANEL the following selection is displayed:

TYPE2 USAGE LANG CLEAR

When S1-1 is ON (up) an altered selection is displayed:

TYPE2 SYSTEM USAGE LANG CLEAR

SYSTEM contains the following 4 options:

TIME This gives date and time.

Note

THE HISTO INFORMATION CAN ONLY BE ANALYSED IN THE FACTORY.

HISTO This gives information on the communication between the MAIN PROCESSOR PCB A1 and the SLAVE PROCESSORS PCB's A3/1, A3/2 and the 270RA PROCESSOR.

3. An additional option is enabled in the ERROR MENU.

CLEAR **CODE RETURN**

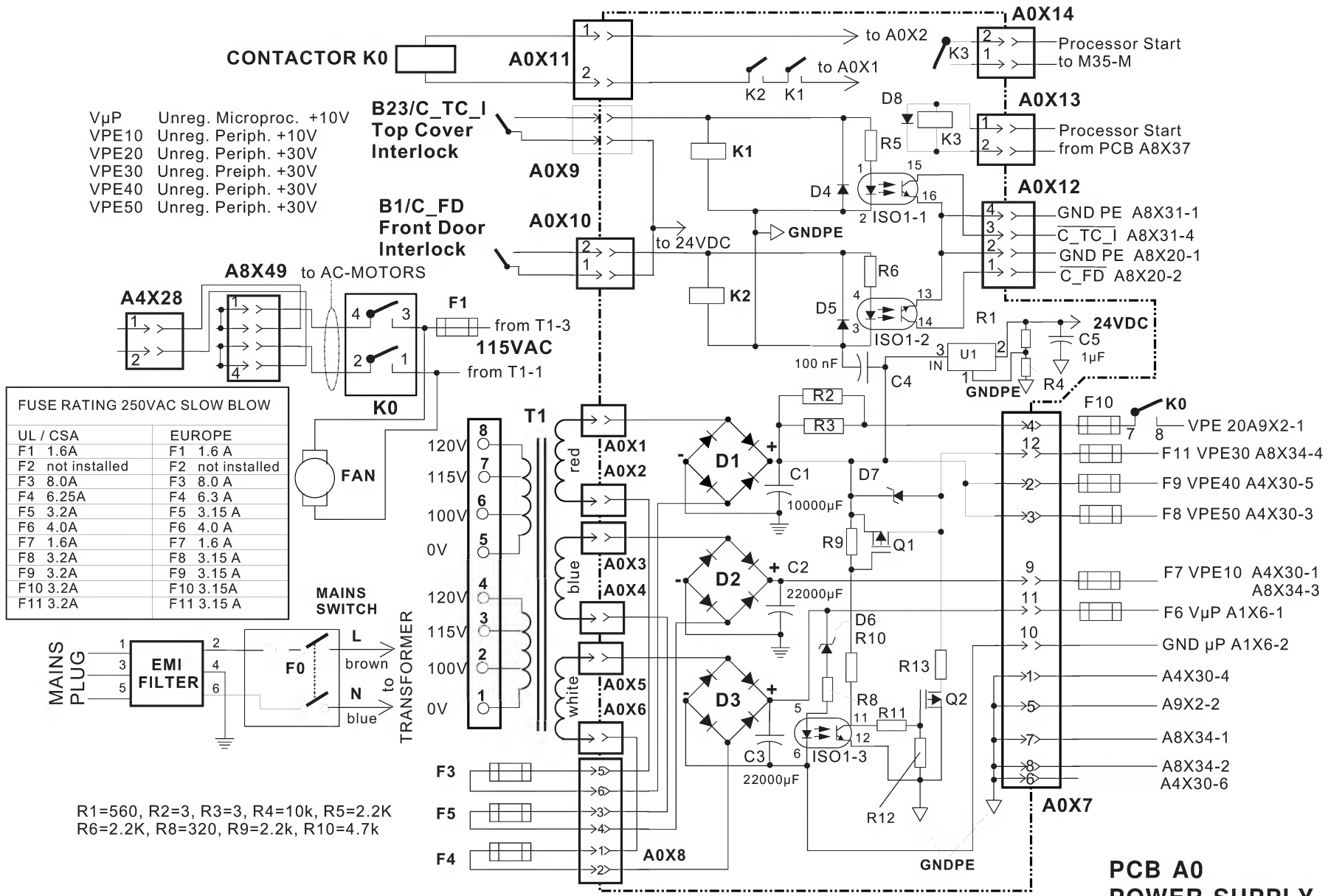
In case of an error (this means the red error lamp is on), the second key from the left is enabled. If it becomes pressed the history of the last faulty cycle is given and the following line is displayed.

⇑ ⇓ **RETURN**

With the ARROW KEYS you can scroll through the history.

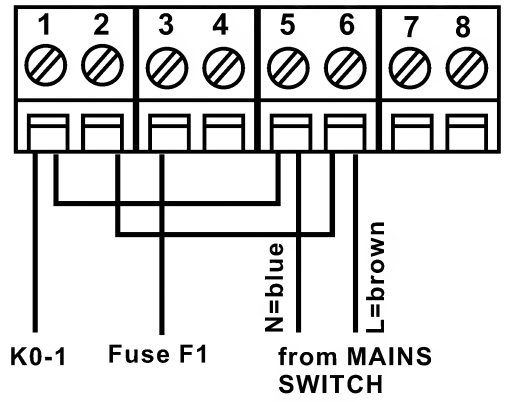
Note

THIS INFORMATION CAN ONLY BE ANALYSED BY THE FACTORY. When a history diskette is made, this information is automatically copied to the diskette, no matter if S1-1 is on or off.

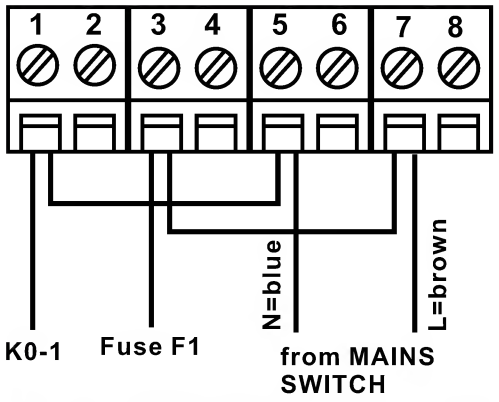

CONTACTOR K0
A0X11
to A0X2
to A0X1
K2 K1
A0X14
K3
Processor Start
to M35-M
A0X13
Processor Start
from PCB A8X37
VµP Unreg. Microproc. +10V
VPE10 Unreg. Periph. +10V
VPE20 Unreg. Periph. +30V
VPE30 Unreg. Preiph. +30V
VPE40 Unreg. Periph. +30V
VPE50 Unreg. Periph. +30V
B23/C_TC_I
Top Cover
Interlock
A0X9
K1
D8
R5
D4
ISO1-1
A0X12
GND PE A8X31-1
C_TC_I A8X31-4
GND PE A8X20-1
C_FD A8X20-2
B1/C_FD
Front Door
Interlock
A0X10
to 24VDC
GNDPE
R6
K2
D5
ISO1-2
R1
24VDC
C5
1µF
100 nF
C4
U1
IN
R4
GNDPE
A8X49 to AC-MOTORS
A4X28
F1
from T1-3
115VAC
from T1-1
K0
FUSE RATING 250VAC SLOW BLOW
UL / CSA EUROPE
F1 1.6A F1 1.6 A
F2 not installed F2 not installed
F3 8.0A F3 8.0 A
F4 6.25A F4 6.3 A
F5 3.2A F5 3.15 A
F6 4.0A F6 4.0 A
F7 1.6A F7 1.6 A
F8 3.2A F8 3.15 A
F9 3.2A F9 3.15 A
F10 3.2A F10 3.15A
F11 3.2A F11 3.15 A
FAN
T1
120V
115V
100V
0V
A0X1
A0X2
A0X3
A0X4
A0X5
A0X6
red
blue
white
R2
R3
D1
C1
10000µF
D7
R9
Q1
D2
C2
22000µF
D6
R10
R13
D3
C3
22000µF
R8
R11
Q2
ISO1-3
R12
F10
K0
VPE 20A9X2-1
F11 VPE30 A8X34-4
F9 VPE40 A4X30-5
F8 VPE50 A4X30-3
F7 VPE10 A4X30-1
A8X34-3
F6 VµP A1X6-1
GND µP A1X6-2
A4X30-4
A9X2-2
A8X34-1
A8X34-2
A4X30-6
A0X7
MAINS SWITCH
MAINS PLUG
EMI FILTER
F0
L
brown
N
blue
to TRANSFORMER
F3
F5
F4
A0X8
GNDPE
R1=560, R2=3, R3=3, R4=10k, R5=2.2K
R6=2.2K, R8=320, R9=2.2k, R10=4.7k
PCB A0
POWER SUPPLY

TRANSFORMER WIRING

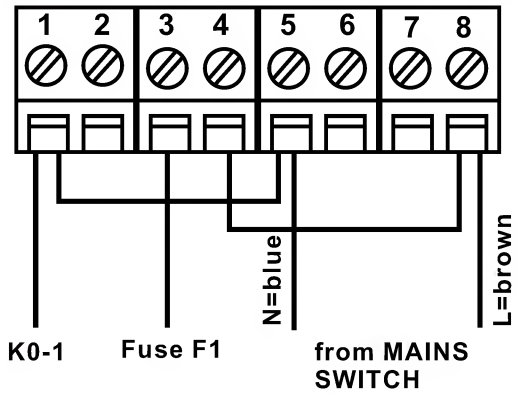
Wiring for 100V (50/60 Hz) Single Phase



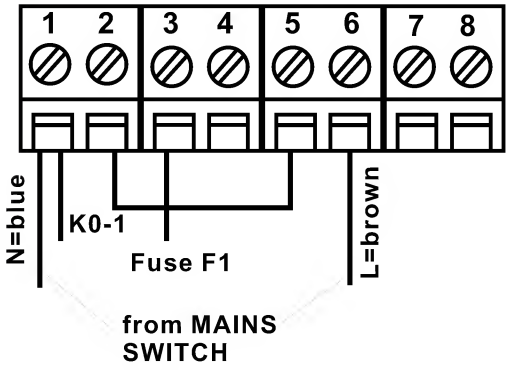
Wiring for 115V (50/60 Hz) Single Phase



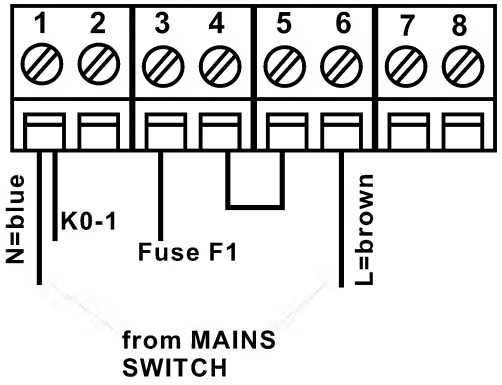
Wiring for 120V (50/60 Hz) Single Phase



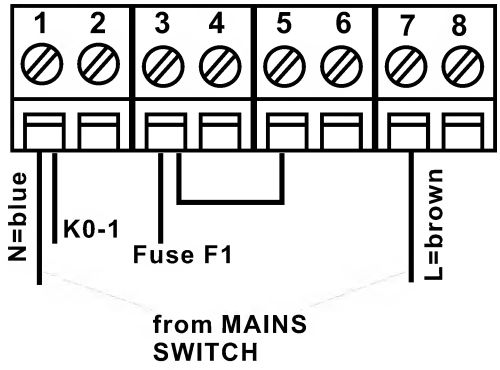
Wiring for 200V (50/60 Hz) Single Phase



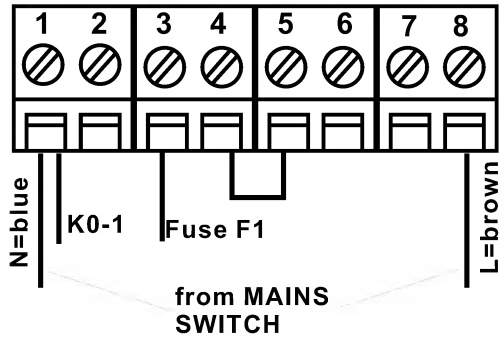
Wiring for 220V (50/60 Hz) Single Phase



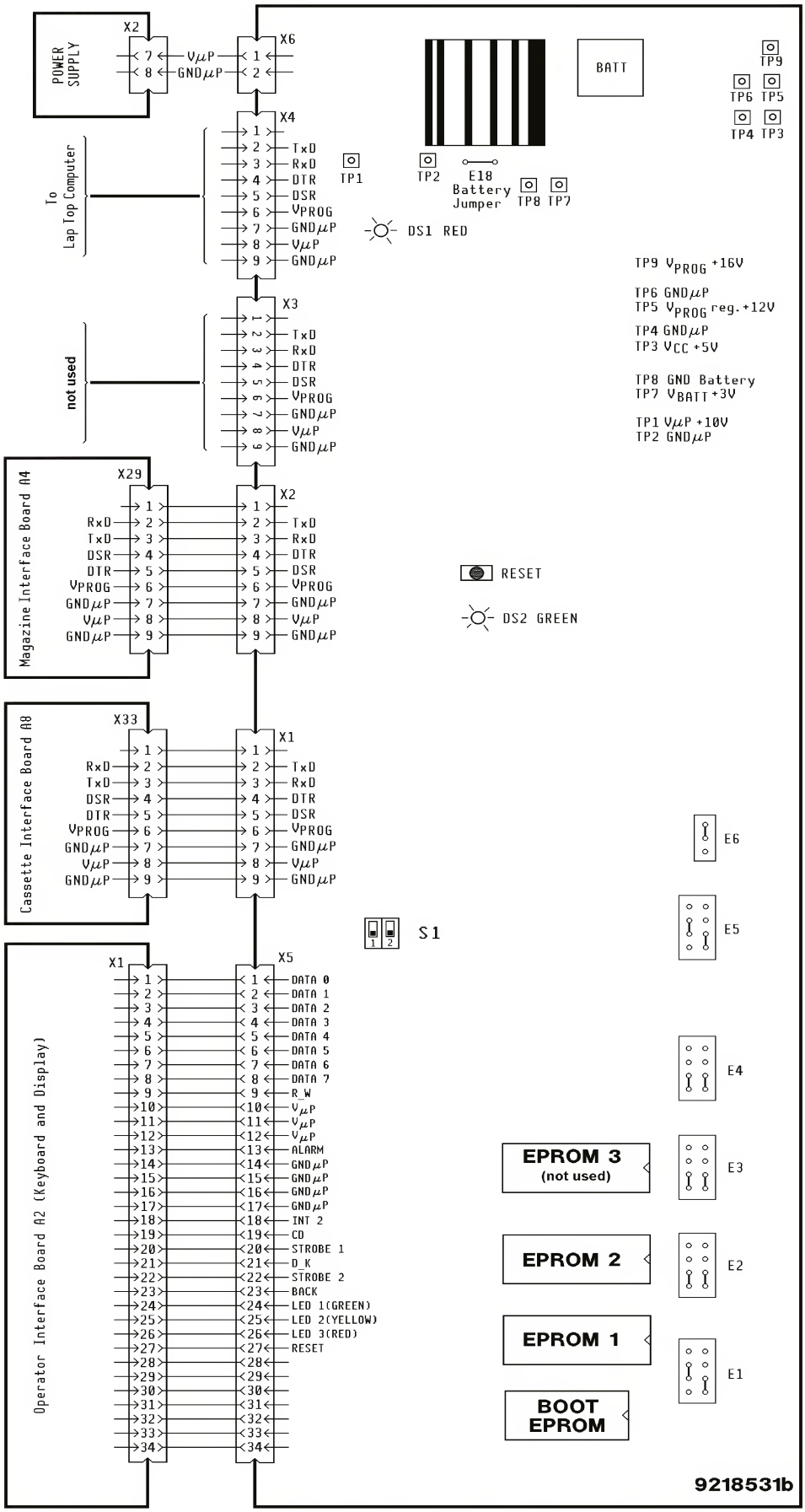
Wiring for 230V (50/60 Hz) Single Phase



Wiring for 240V (50/60 Hz) Single Phase



PCB A1 MAIN PROCESSOR



R3 BACKLIGHT SWITCH OFF
R4 DISPLAY CONTRAST
R15 BUZZER VOLUME

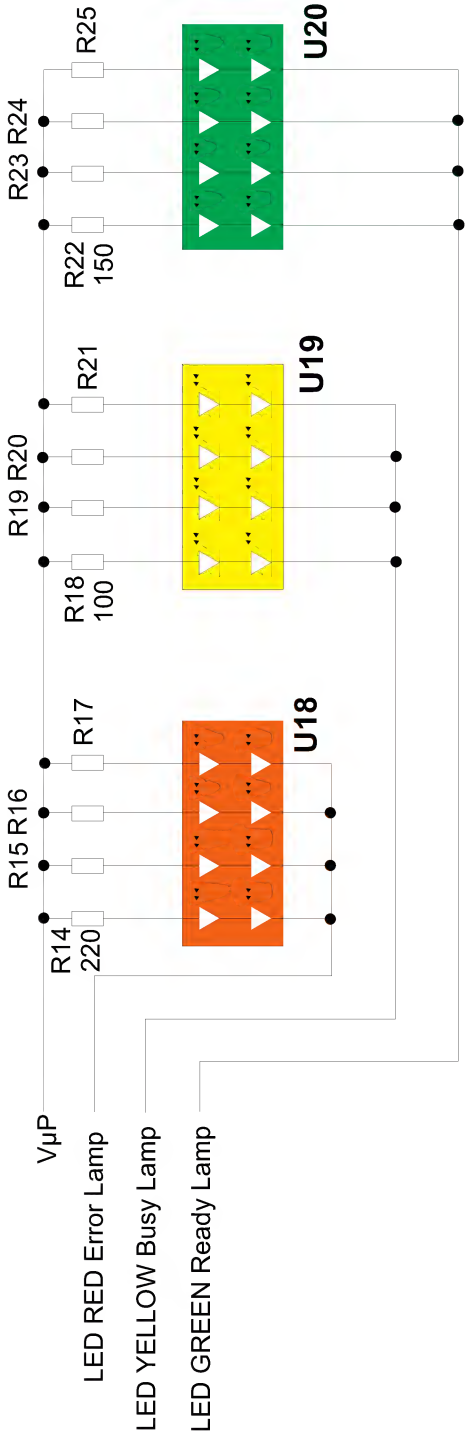
TP1 = VCC +5V
TP2 = VµP +10V
TP3 = GND µP
TP4 = BACKLIGHT SUPPLY +4.7V
TP5 = Vee CONTRAST VOLTAGE -10V...-15V

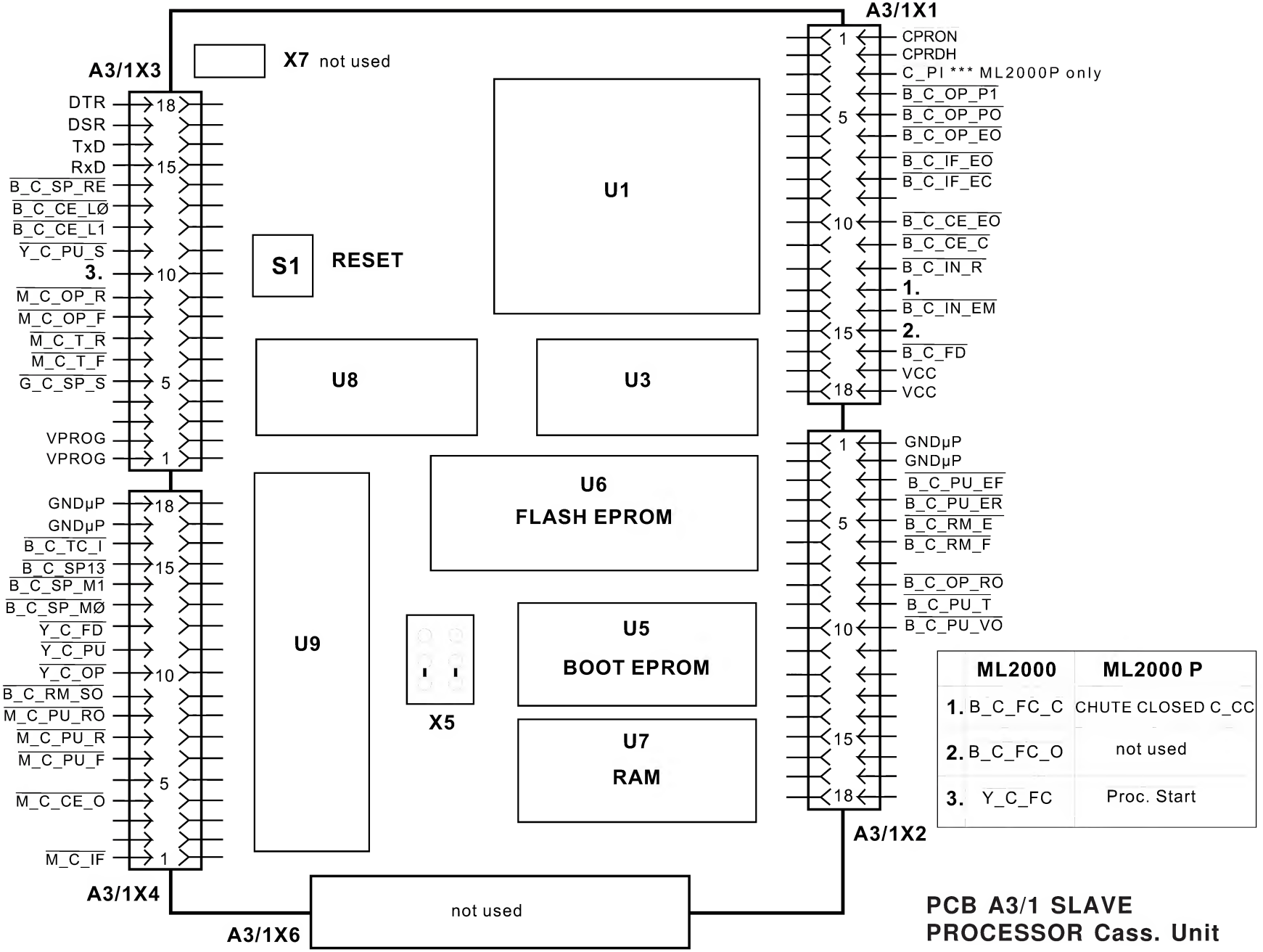
FACTORY SETTING SWITCH S1
S1-1 ON (ON-Board Contrast Poti)*
S1-2 OFF (40 Char / Line)*
S1-3 OFF (Black Characters)*
S1-4 ON (Backlight always on)

S1-4 OFF Backlight ON if roomlight > 120 Lux
Backlight OFF if roomlight < 30 Lux

* Do not change the factory setting of S1-1, S1-2 and S1-3

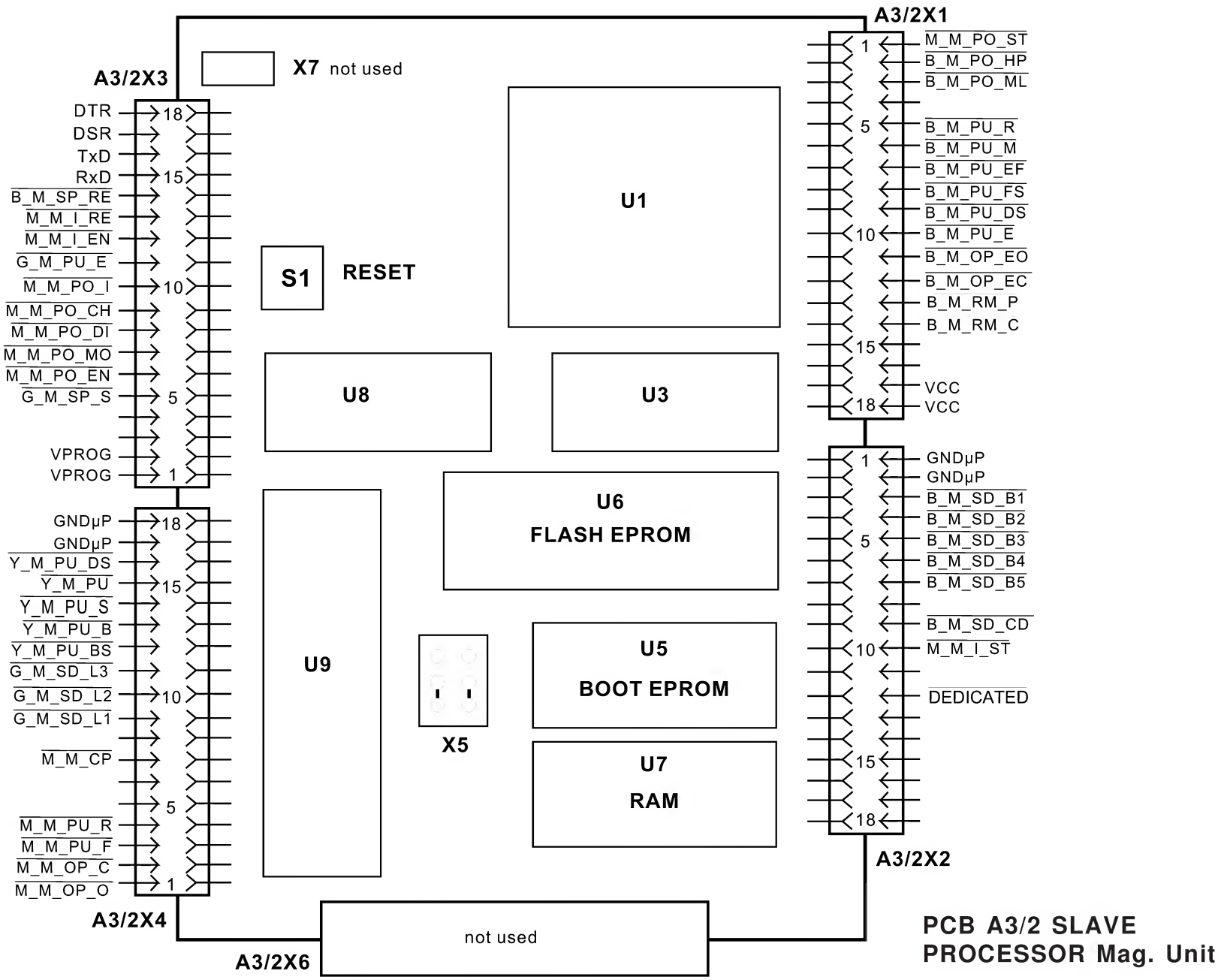
PCB A2 OPERATOR INTERFACE Sheet 1 of 2

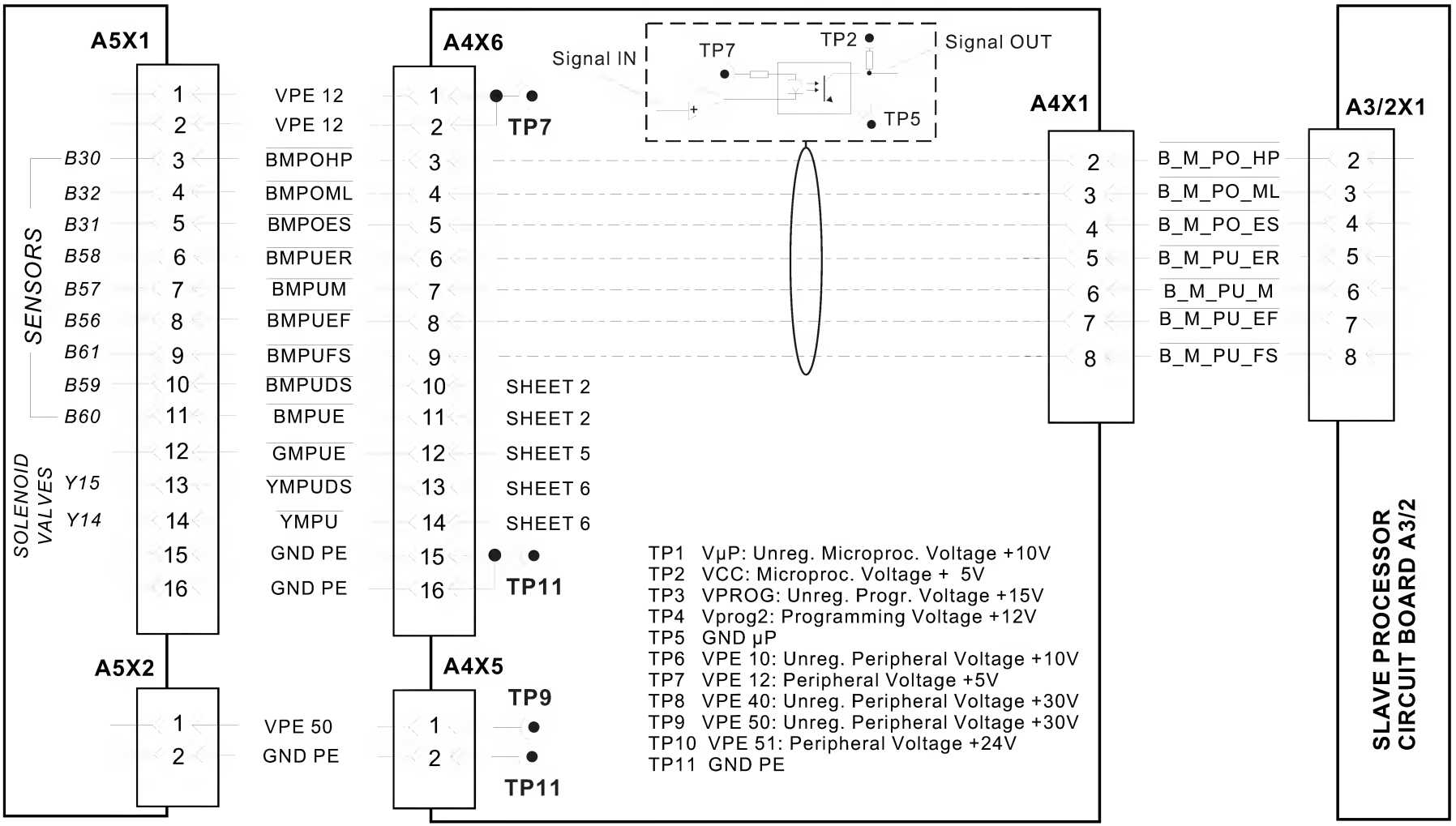

PCB A2 OPERATOR
INTERFACE Sheet 2 of 2
U20
U19
U18
R25
R24
R23
R22
150
R21
R20
R19
R18
100
R17
R16
R15
R14
220
VµP
LED RED Error Lamp
LED YELLOW Busy Lamp
LED GREEN Ready Lamp



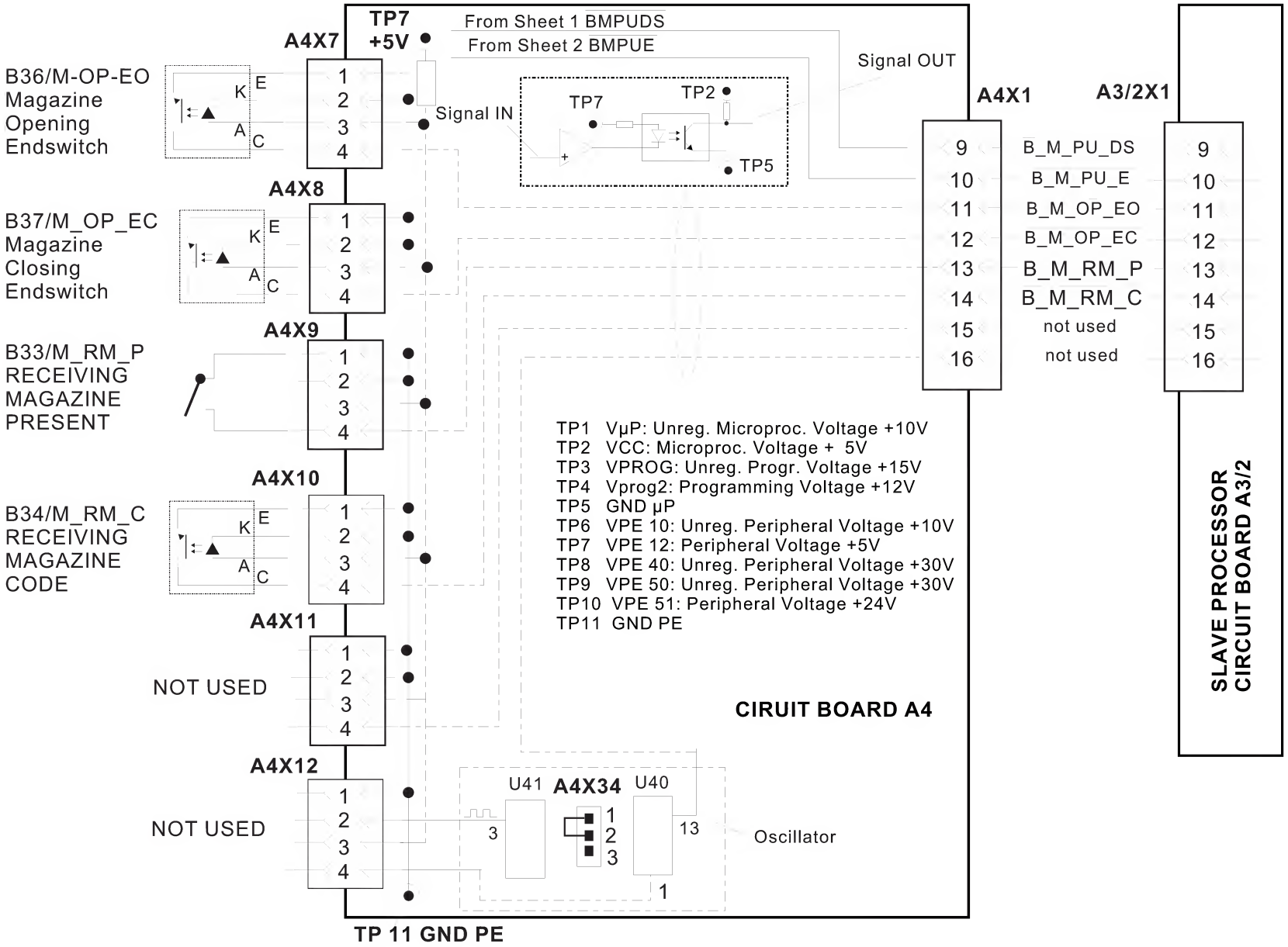
	ML2000	ML2000 P
1.	B_C_FC_C	CHUTE CLOSED C_CC
2.	B_C_FC_O	not used
3.	Y_C_FC	Proc. Start

PCB A3/1 SLAVE
PROCESSOR Cass. Unit

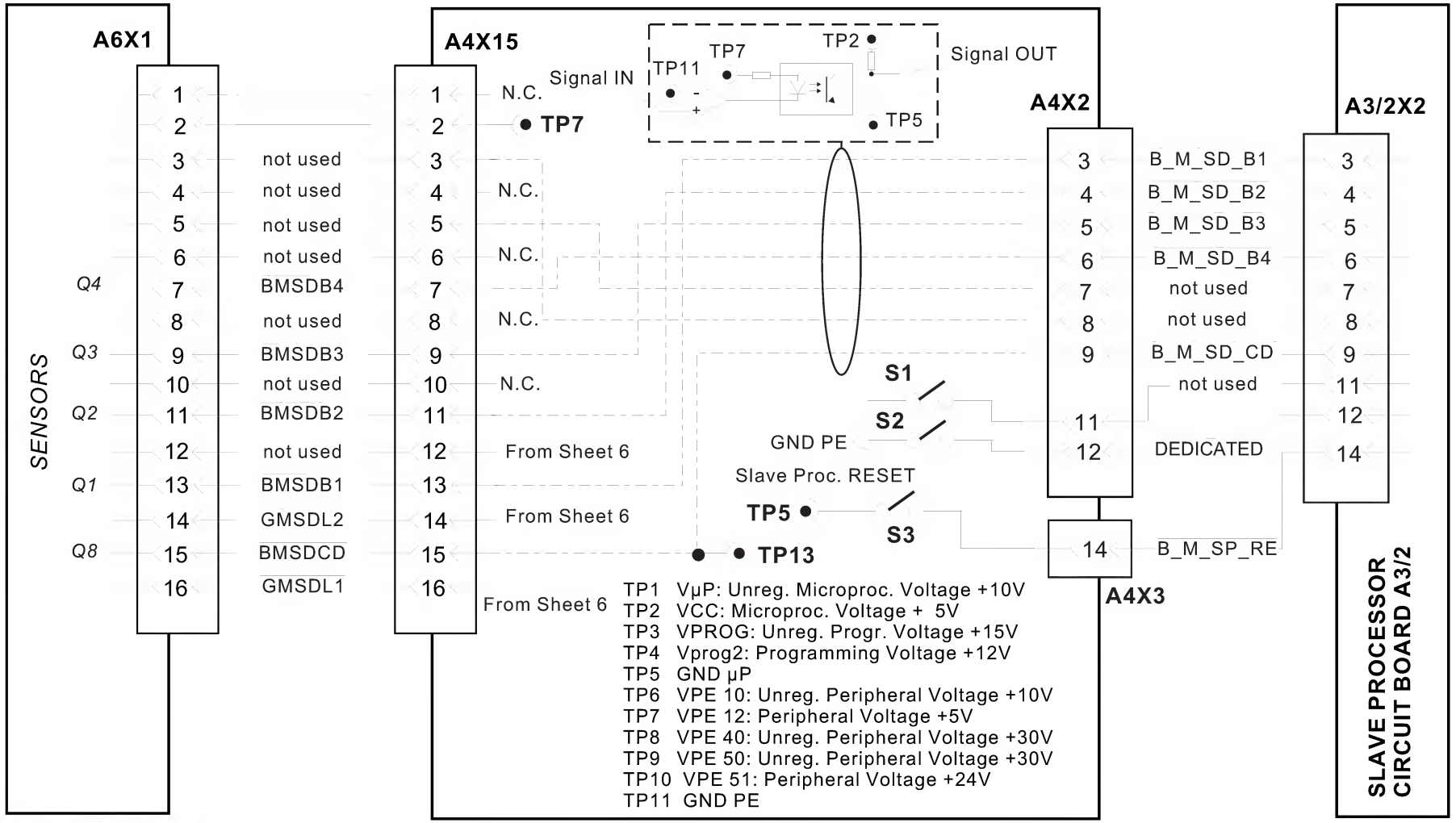

A3/2X1
M_M_PO_ST
B_M_PO_HP
B_M_PO_ML
B_M_PU_R
B_M_PU_M
B_M_PU_EF
B_M_PU_FS
B_M_PU_DS
B_M_PU_E
B_M_OP_EO
B_M_OP_EC
B_M_RM_P
B_M_RM_C
VCC
VCC
A3/2X3
DTR
DSR
TxD
RxD
B_M_SP_RE
M_M_I_RE
M_M_I_EN
G_M_PU_E
M_M_PO_I
M_M_PO_CH
M_M_PO_DI
M_M_PO_MO
M_M_PO_EN
G_M_SP_S
VPROG
VPROG
X7 not used
S1
RESET
U1
U8
U3
U6
FLASH EPROM
U9
X5
U5
BOOT EPROM
U7
RAM
GNDµP
GNDµP
B_M_SD_B1
B_M_SD_B2
B_M_SD_B3
B_M_SD_B4
B_M_SD_B5
B_M_SD_CD
M_M_I_ST
DEDICATED
GNDµP
GNDµP
Y_M_PU_DS
Y_M_PU
Y_M_PU_S
Y_M_PU_B
Y_M_PU_BS
G_M_SD_L3
G_M_SD_L2
G_M_SD_L1
M_M_CP
M_M_PU_R
M_M_PU_F
M_M_OP_C
M_M_OP_O
A3/2X2
A3/2X4
A3/2X6
not used
PCB A3/2 SLAVE
PROCESSOR Mag. Unit



PCB A4 Mag. Interface
Sheet 1 of 9



PCB A4 Mag. Interface
Sheet 2 of 9

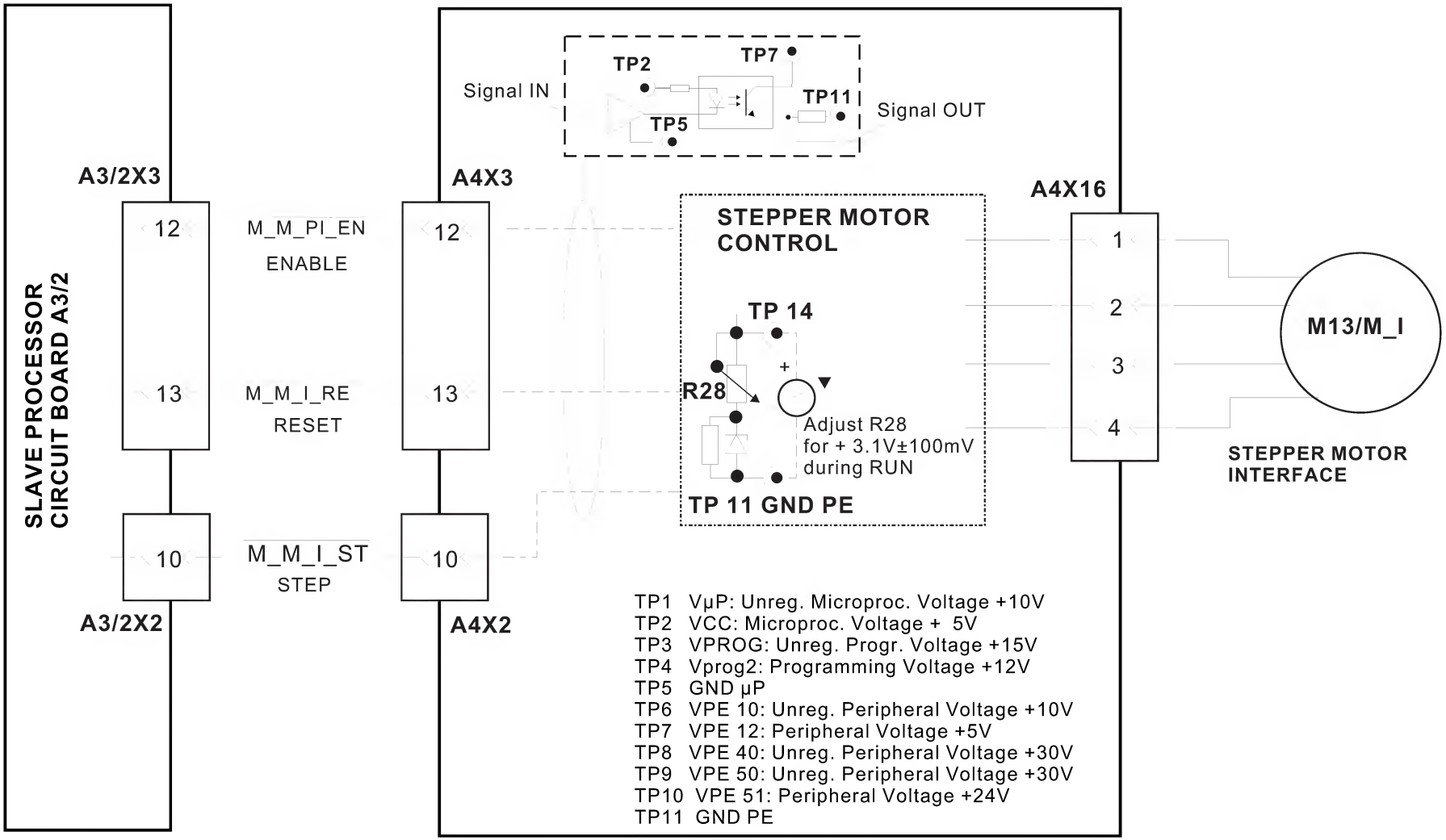


MAGAZINE SENSE CIRCUIT BOARD A6

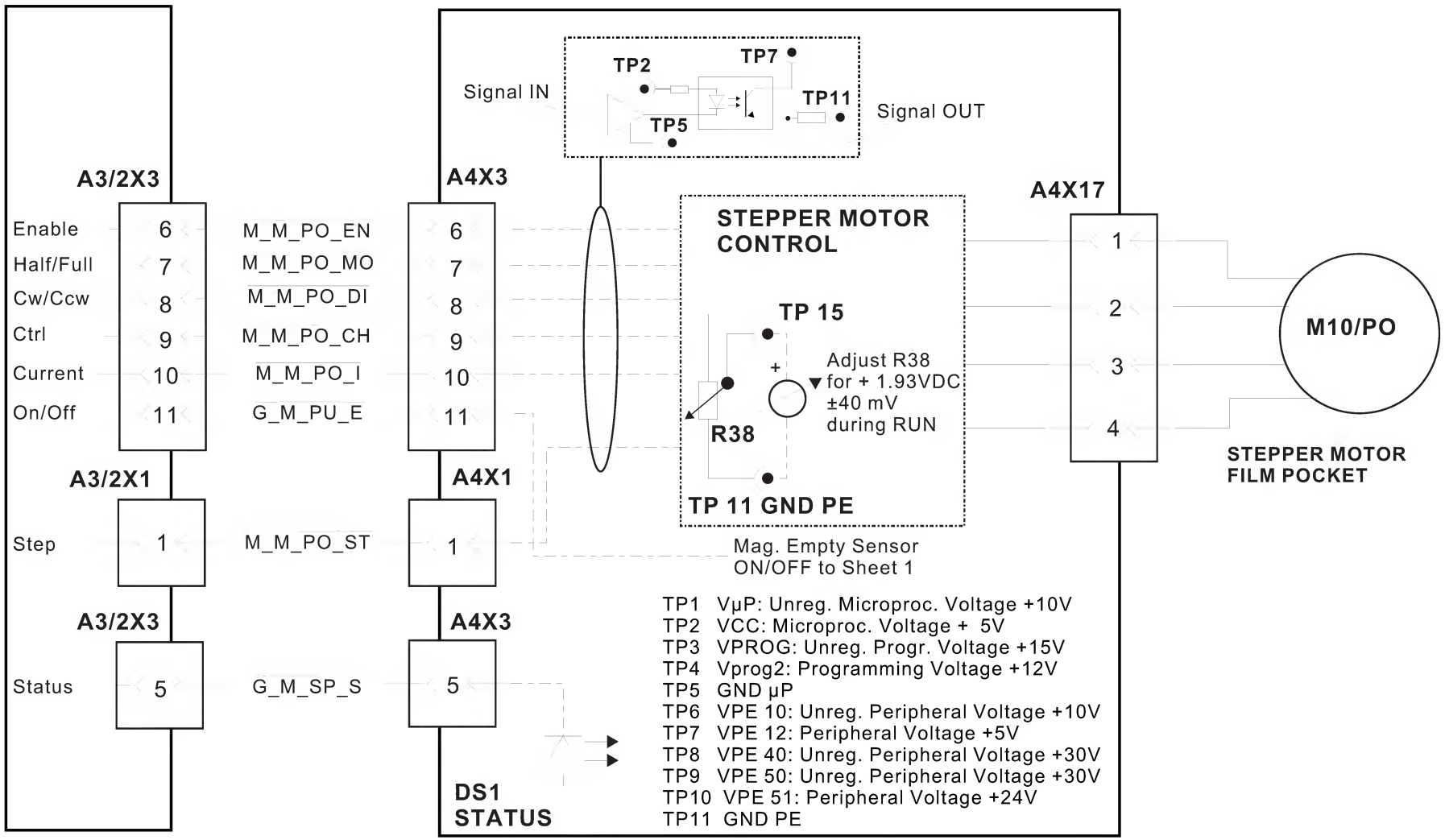
CIRUIT BOARD A4

S2 = OFF DEDICATED RECEIVING MAGAZINE
S2 = ON NONE DEDICATED RECEIVING MAGAZINE

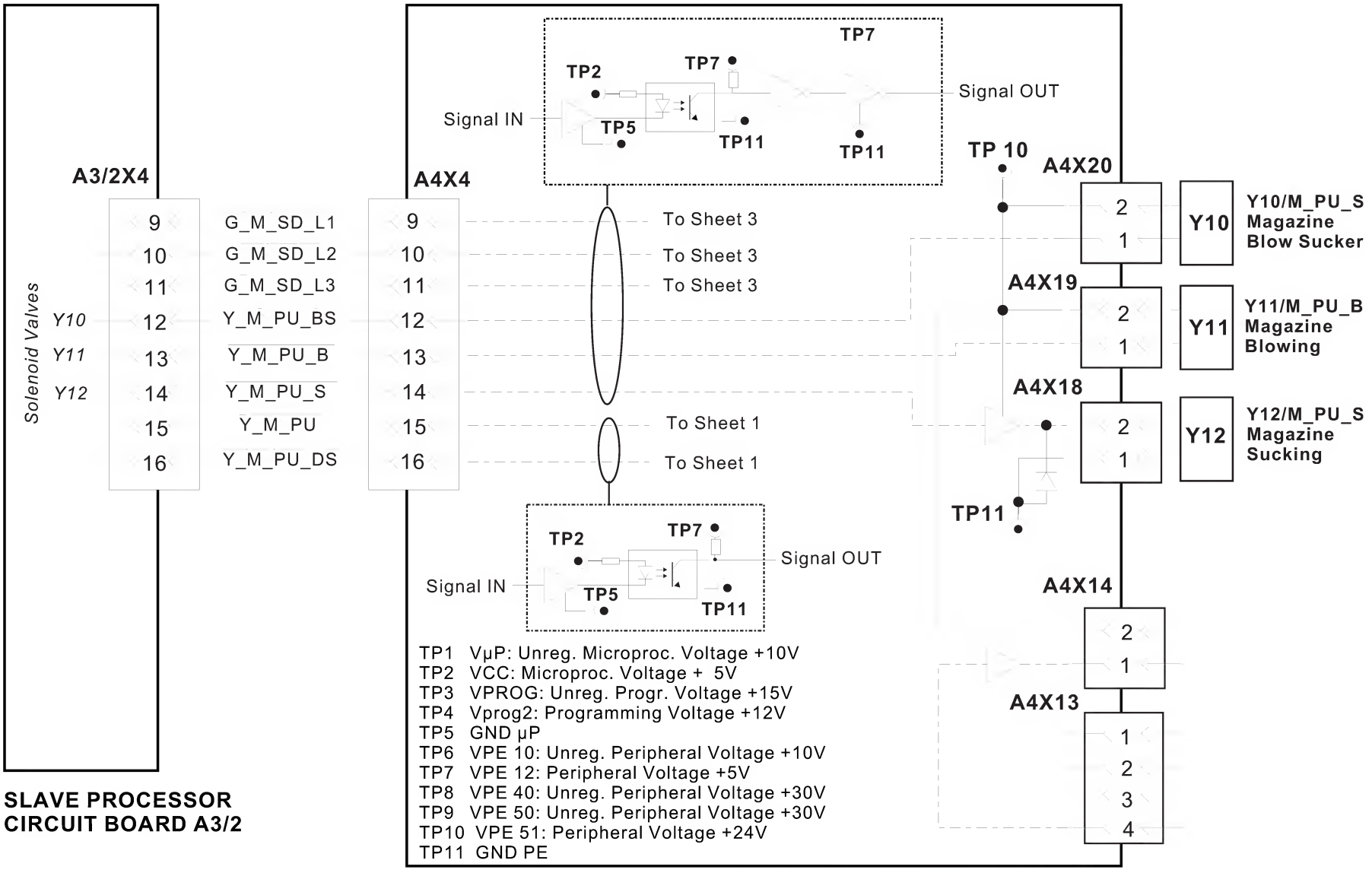
PCB A4 Mag. Interface
Sheet 3 of 9



PCB A4 Mag. Interface
Sheet 4 of 9



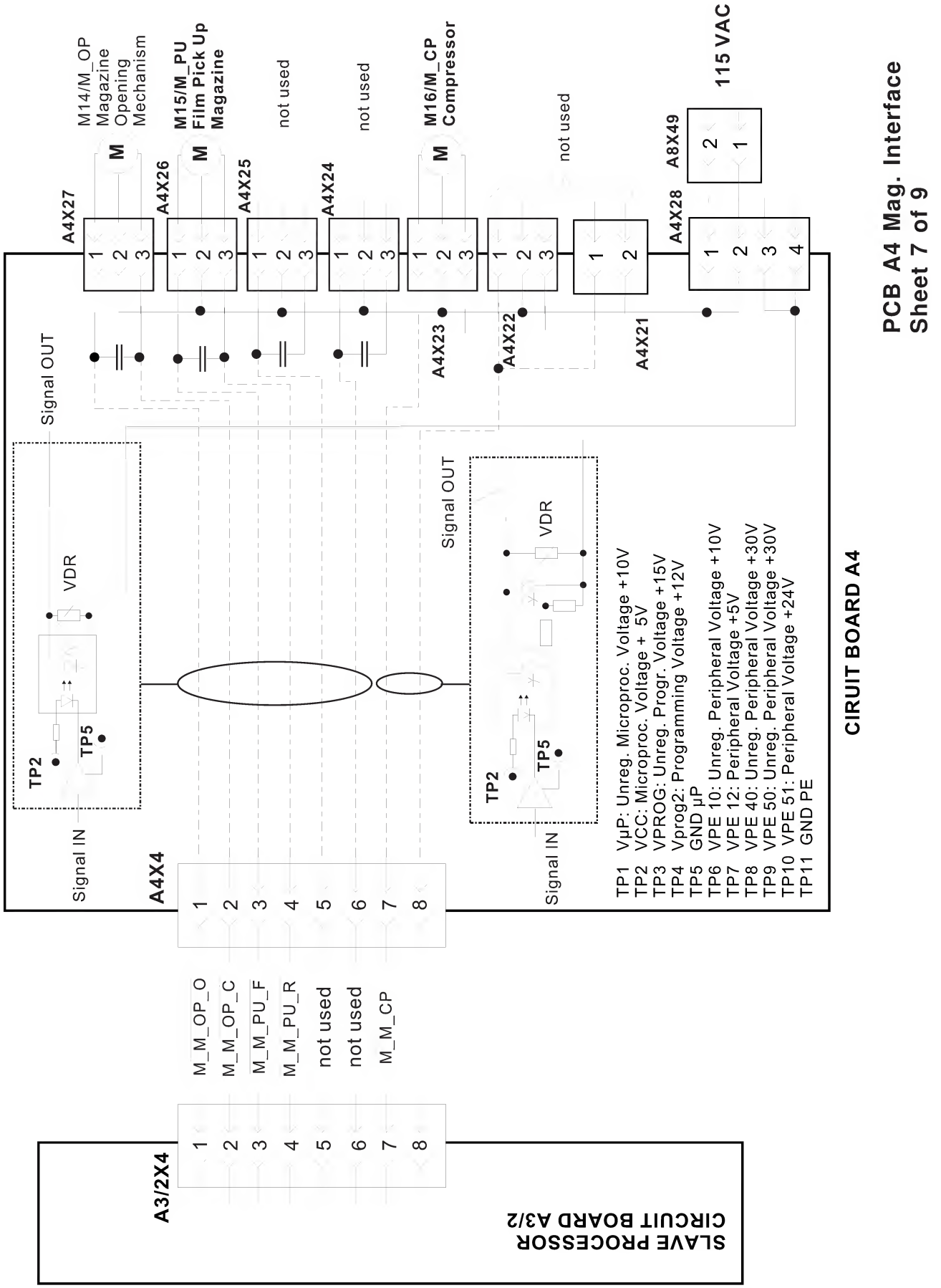
PCB A4 Mag. Interface
Sheet 5 of 9

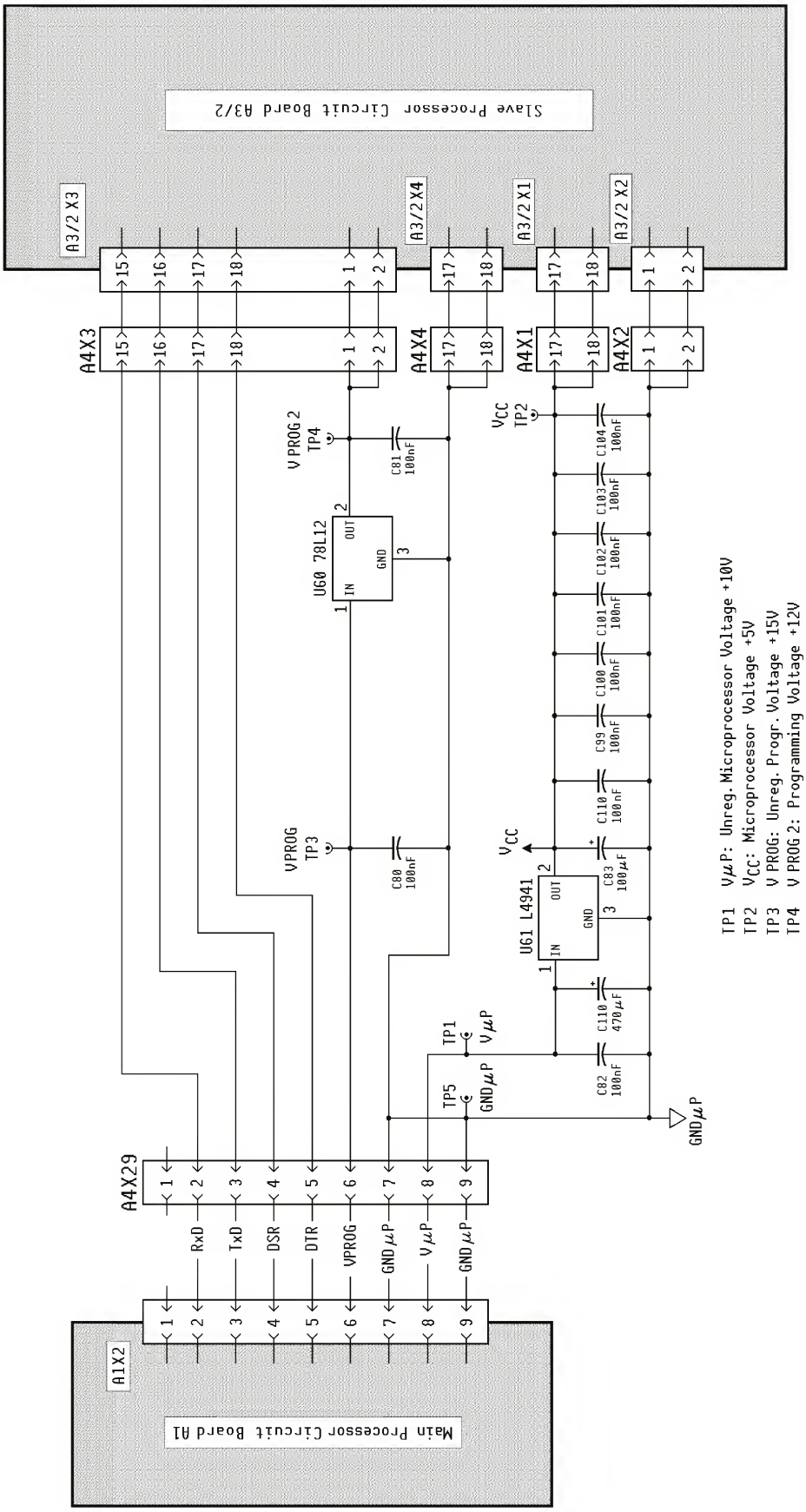


SLAVE PROCESSOR CIRCUIT BOARD A3/2

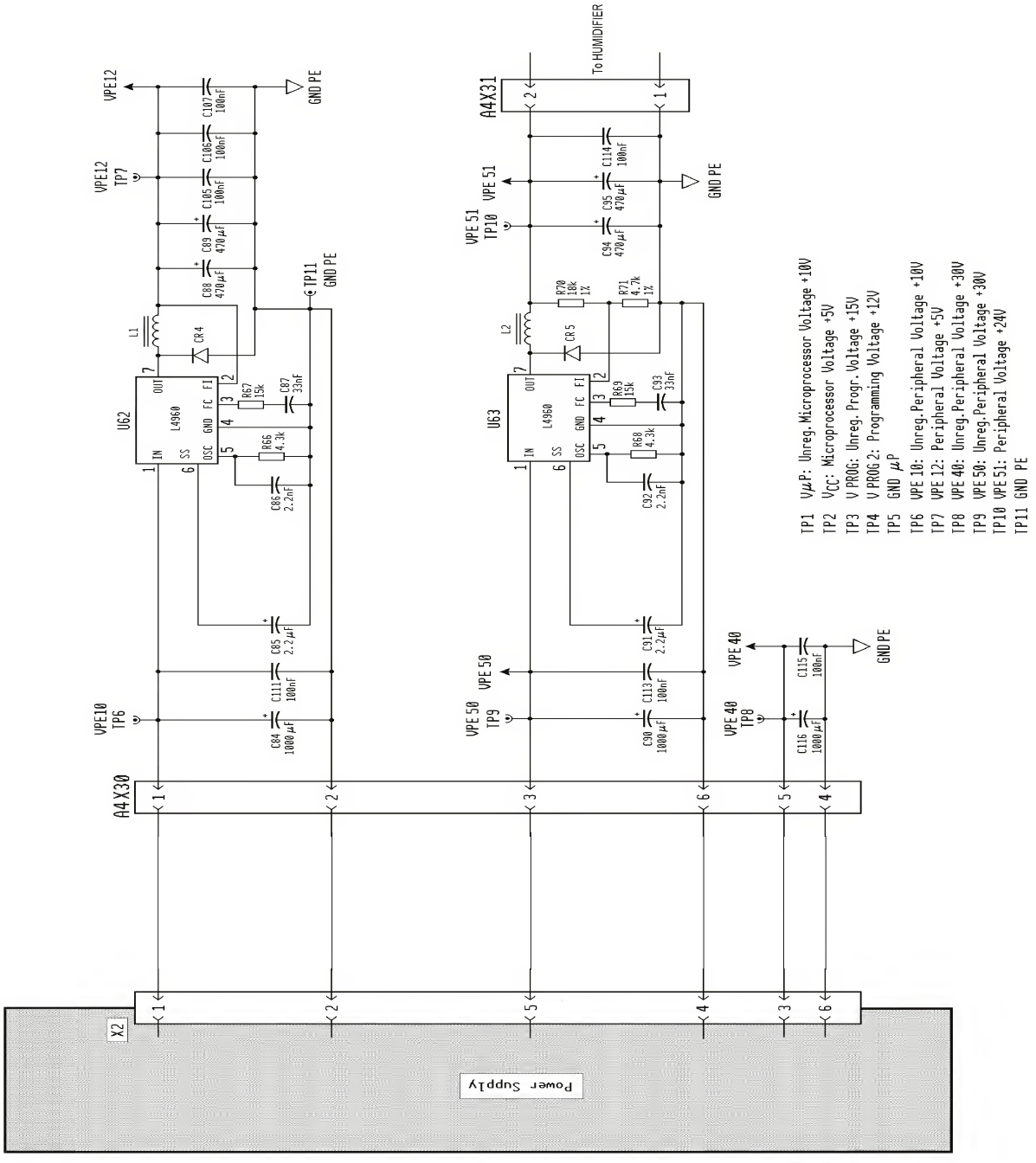
CIRUIT BOARD A4

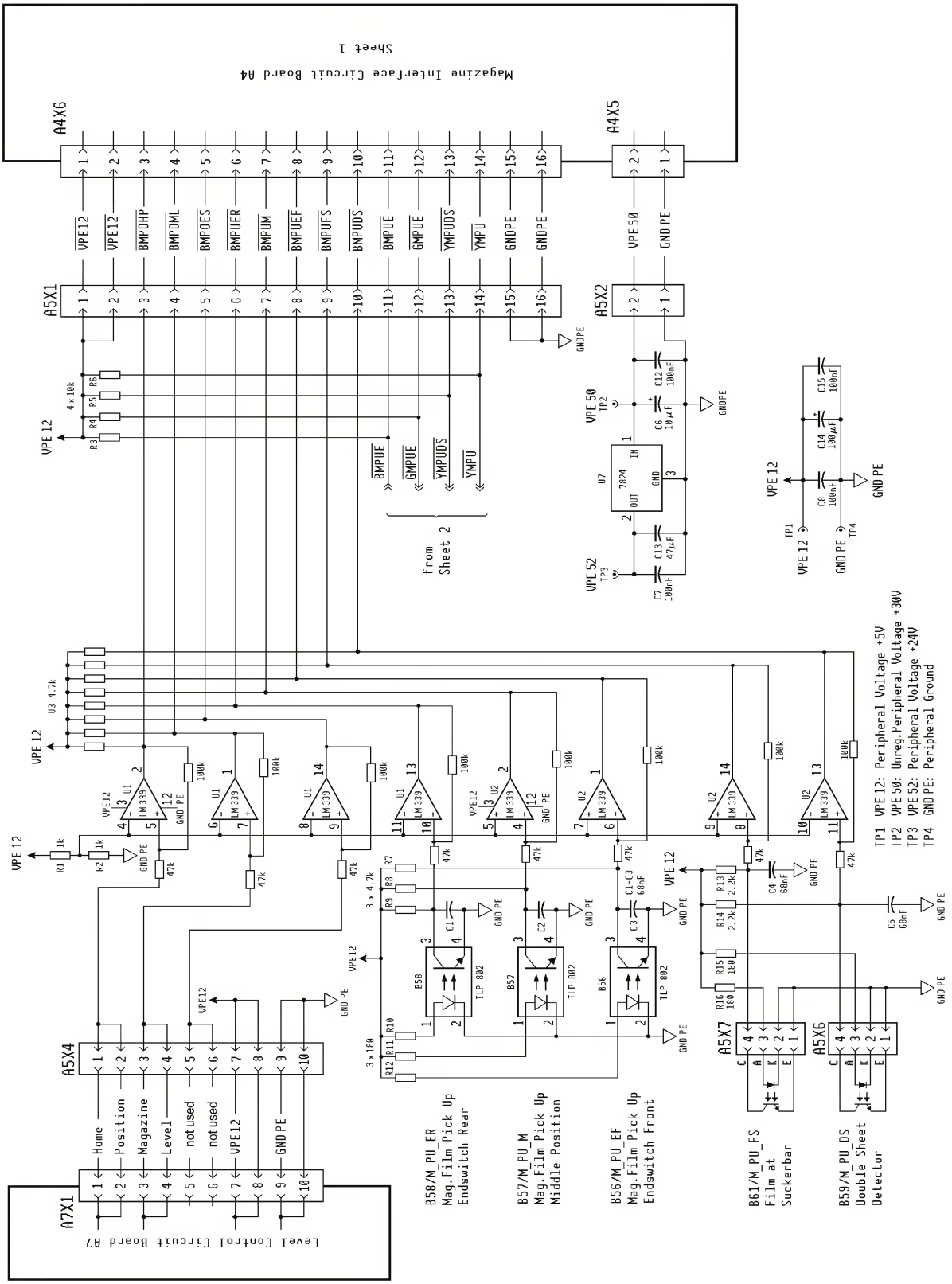
PCB A4 Mag. Interface
Sheet 6 of 9


PCB A4 Mag. Interface
Sheet 7 of 9
CIRUIT BOARD A4
SLAVE PROCESSOR
CIRCUIT BOARD A3/2
A3/2X4
A4X4
M_M_OP_O
M_M_OP_C
M_M_PU_F
M_M_PU_R
not used
not used
M_M_CP
Signal IN
Signal OUT
TP2
TP5
VDR
A4X27
A4X26
A4X25
A4X24
A4X23
A4X22
A4X21
A4X28
A8X49
M14/M_OP Magazine Opening Mechanism
M15/M_PU Film Pick Up Magazine
M16/M_CP Compressor
not used
not used
not used
115 VAC
TP1 VµP: Unreg. Microproc. Voltage +10V
TP2 VCC: Microproc. Voltage + 5V
TP3 VPROG: Unreg. Progr. Voltage +15V
TP4 Vprog2: Programming Voltage +12V
TP5 GND µP
TP6 VPE 10: Unreg. Peripheral Voltage +10V
TP7 VPE 12: Peripheral Voltage +5V
TP8 VPE 40: Unreg. Peripheral Voltage +30V
TP9 VPE 50: Unreg. Peripheral Voltage +30V
TP10 VPE 51: Peripheral Voltage +24V
TP11 GND PE

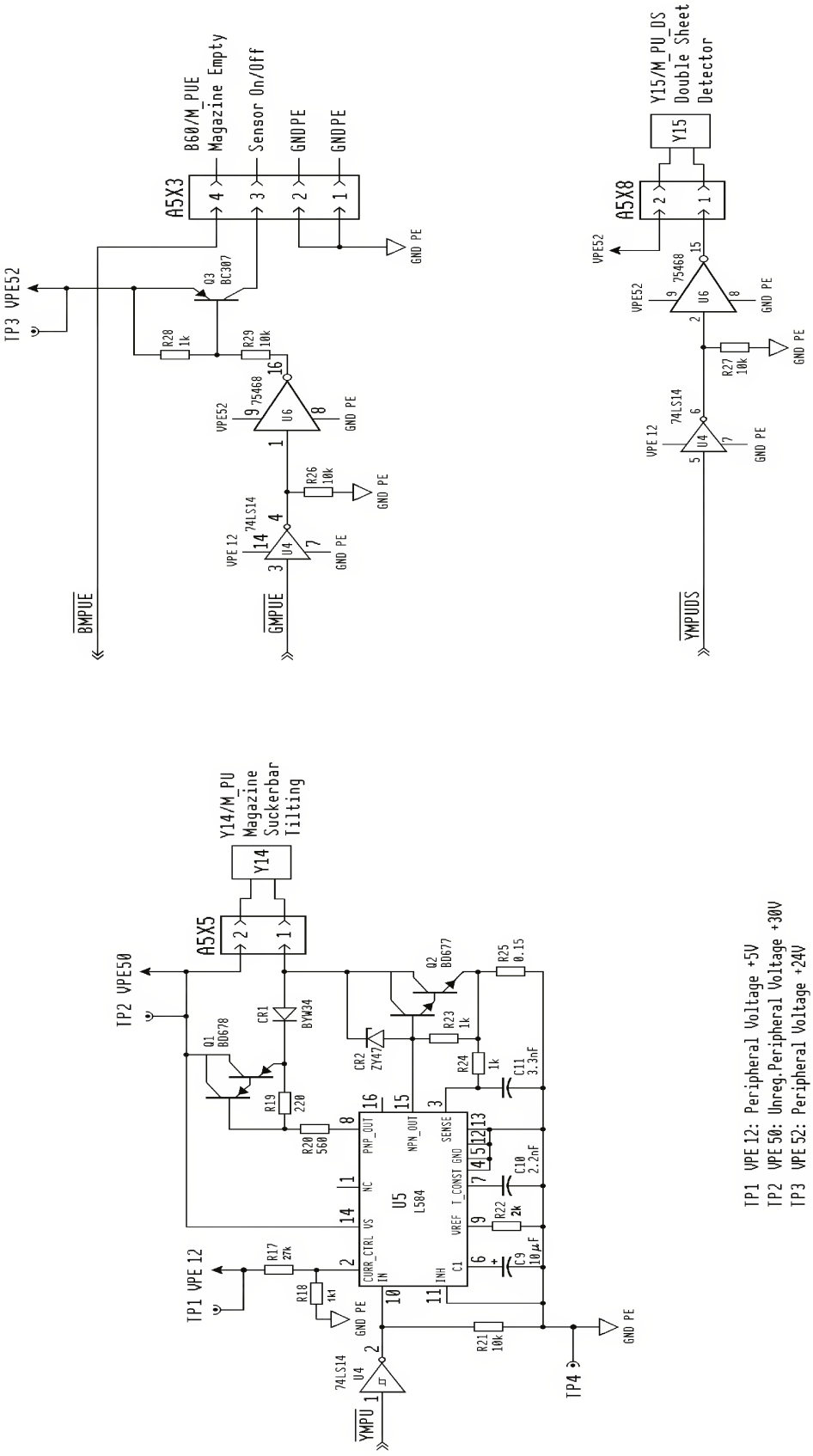


PCB A4 Mag. Interface
Sheet 8 of 9

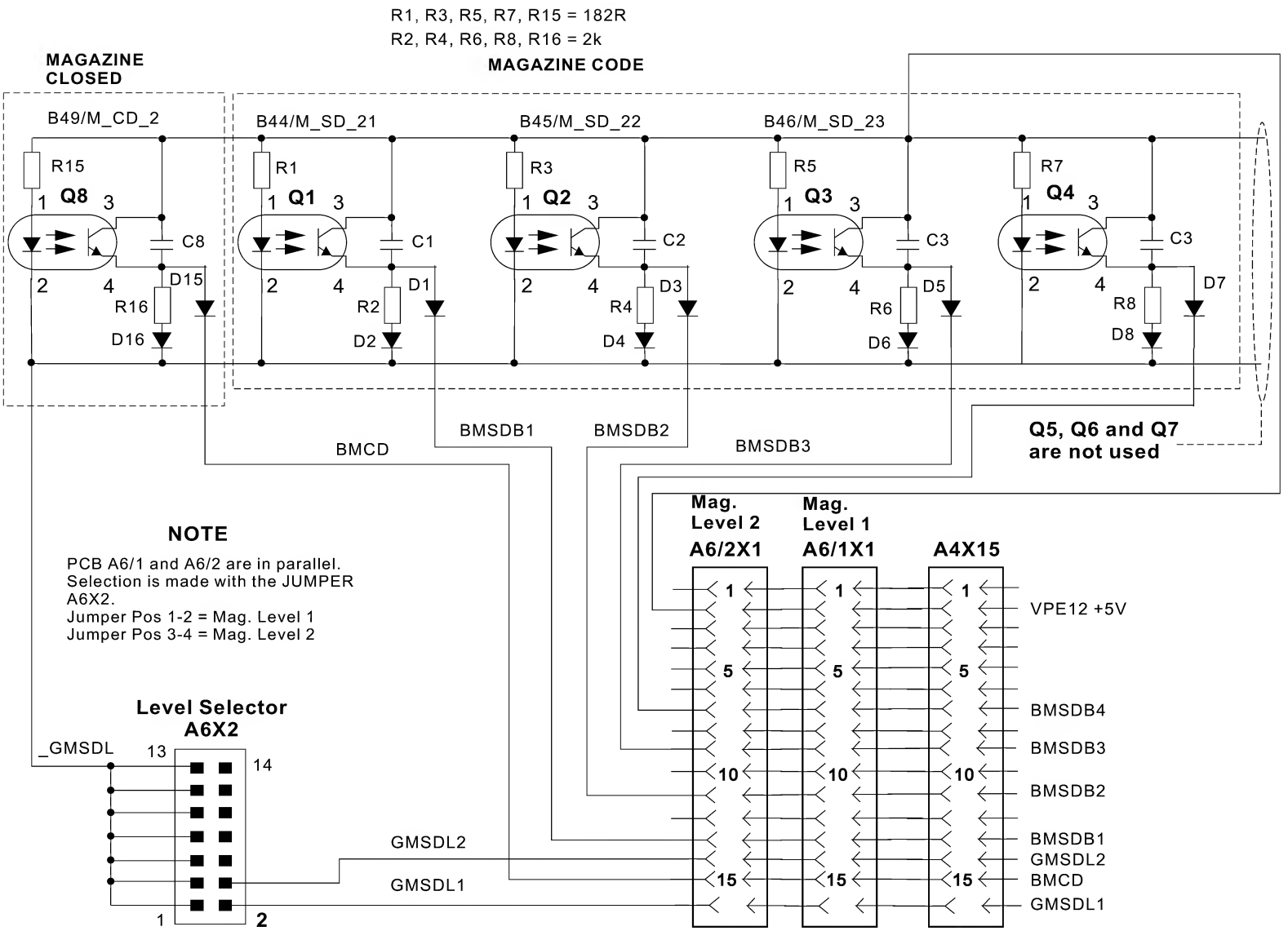

PCB A4 Mag. Interface
Sheet 9 of 9
TP1 VμP: Unreg.Microprocessor Voltage +10V
TP2 VCC: Microprocessor Voltage +5V
TP3 V PROG: Unreg. Progr.Voltage +15V
TP4 V PROG 2: Programming Voltage +12V
TP5 GND μP
TP6 VPE 10: Unreg.Peripheral Voltage +10V
TP7 VPE 12: Peripheral Voltage +5V
TP8 VPE 40: Unreg.Peripheral Voltage +30V
TP9 VPE 50: Unreg.Peripheral Voltage +30V
TP10 VPE 51: Peripheral Voltage +24V
TP11 GND PE
A4X30
A4X31
To HUMIDIFIER
X2
Power Supply
U62
U63
L4960
VPE12
VPE10
VPE50
VPE40
VPE51
GND PE



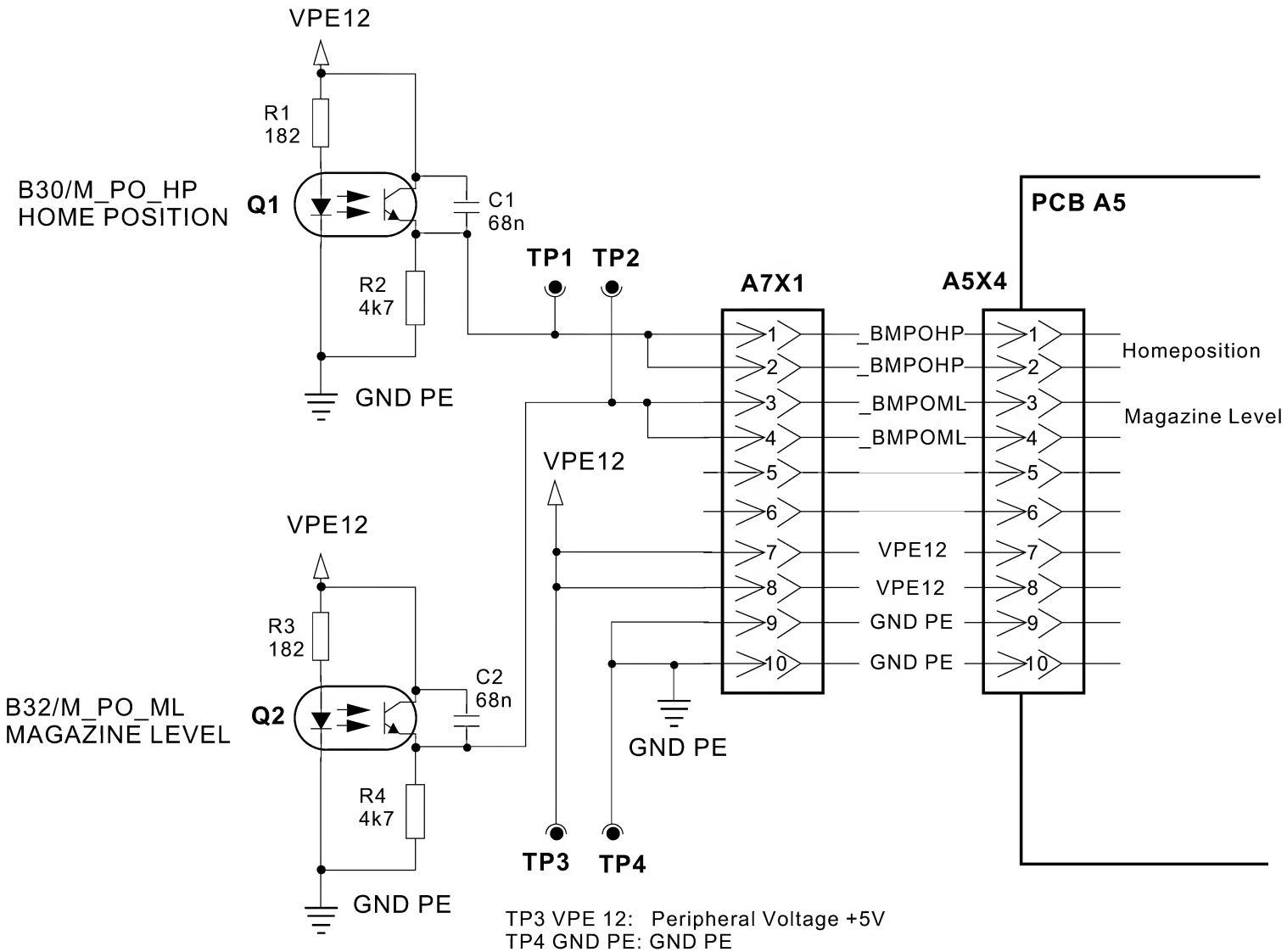
PCB A5 FILMPOCKET
Sheet 1 of 2



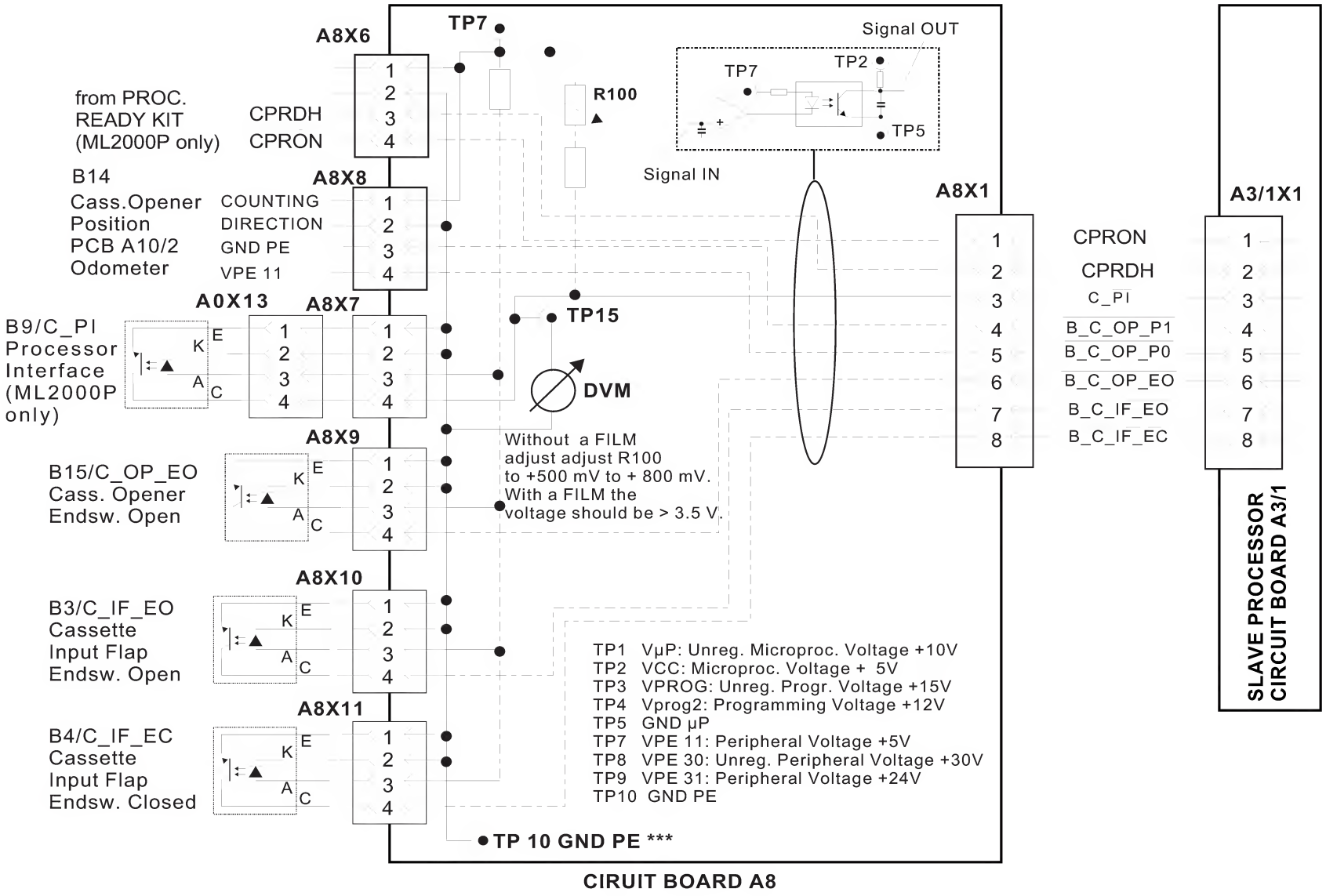
PCB A5 FILMPOCKET
Sheet 2 of 2



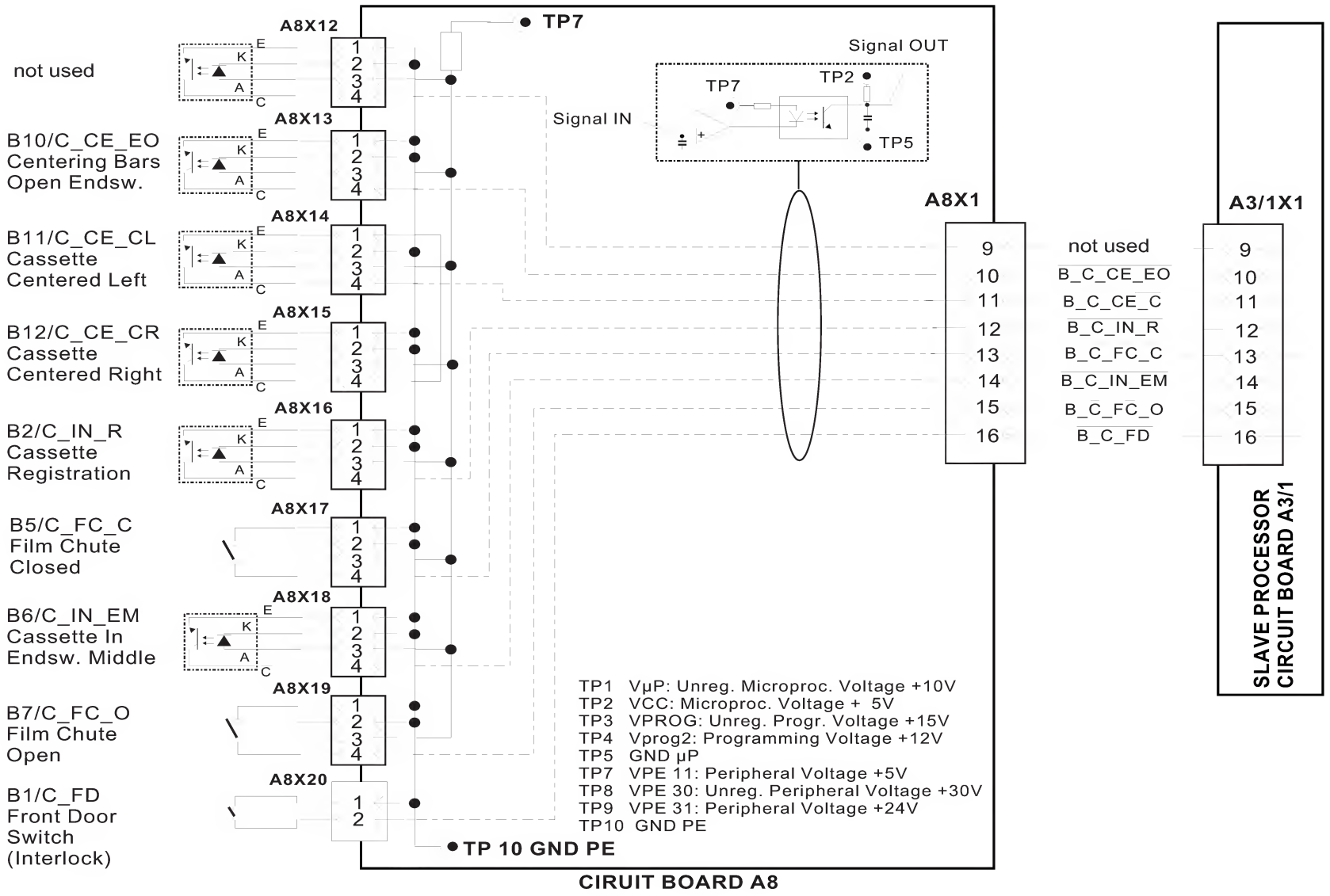
PCB A6 MAGAZINE CODE



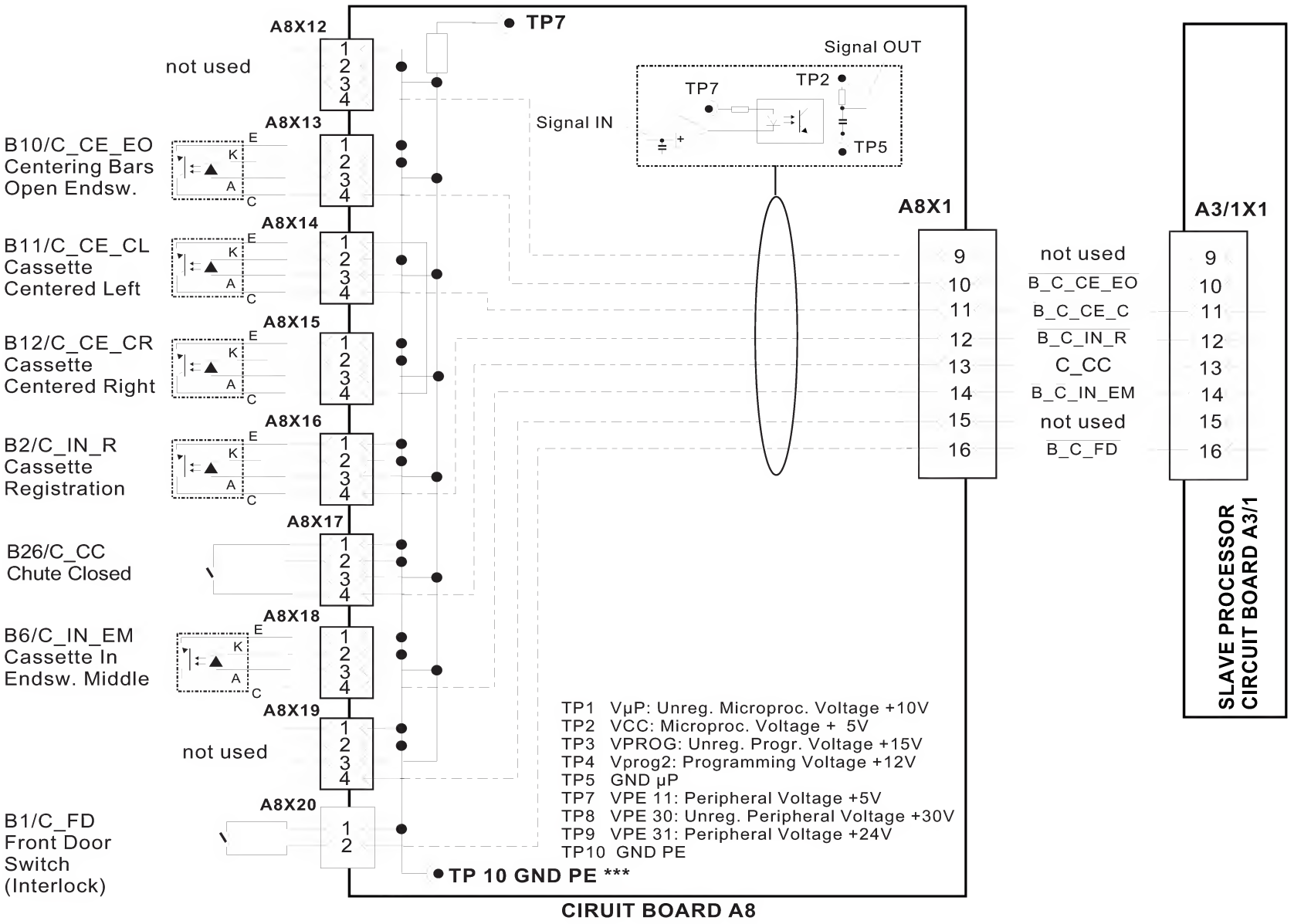
PCB A7 LEVEL CONTROL



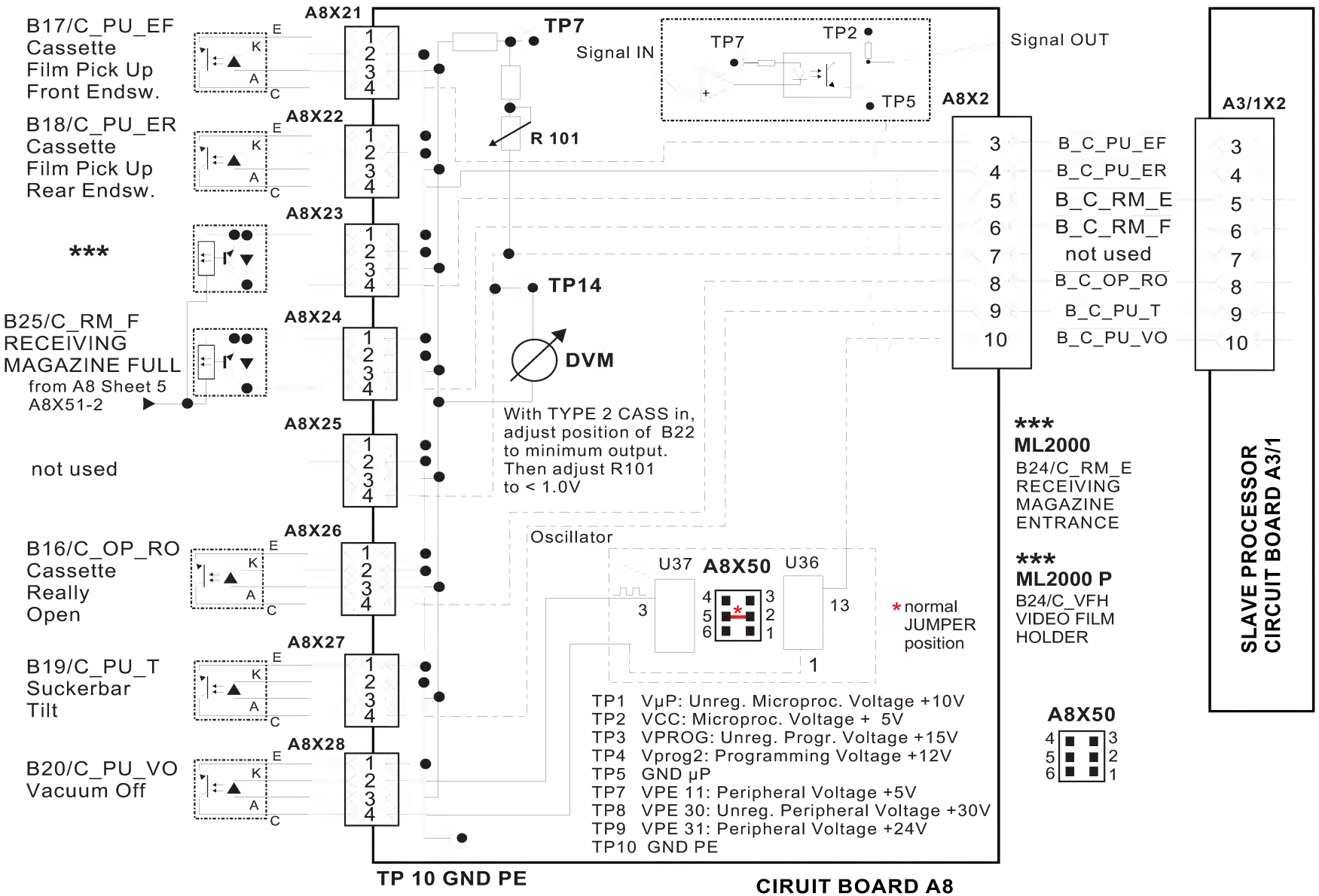
PCB A8 Mag. Interface
Sheet 1 of 10



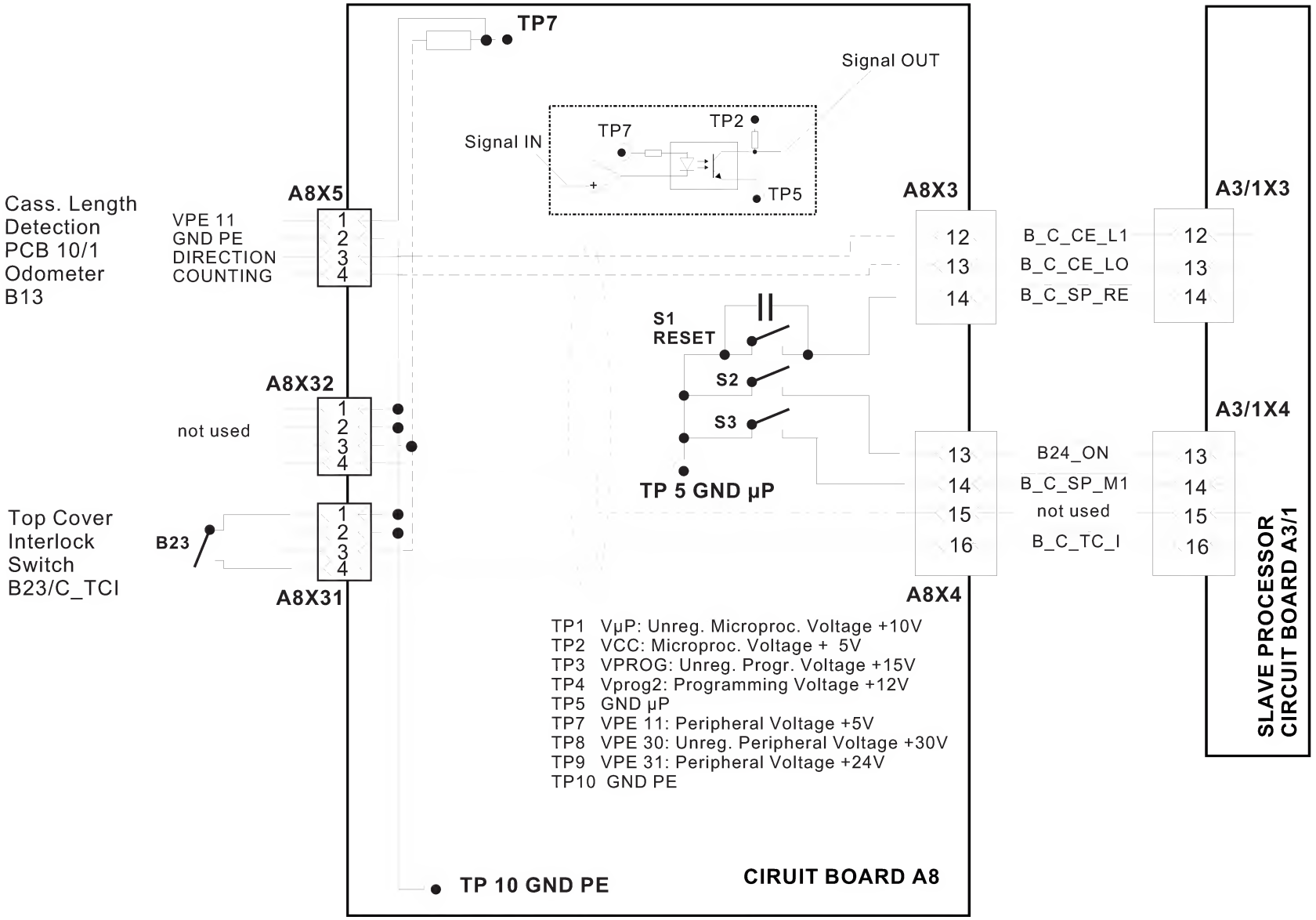
PCB A8 Mag. Interface
ML2000 Sheet 2 of 10



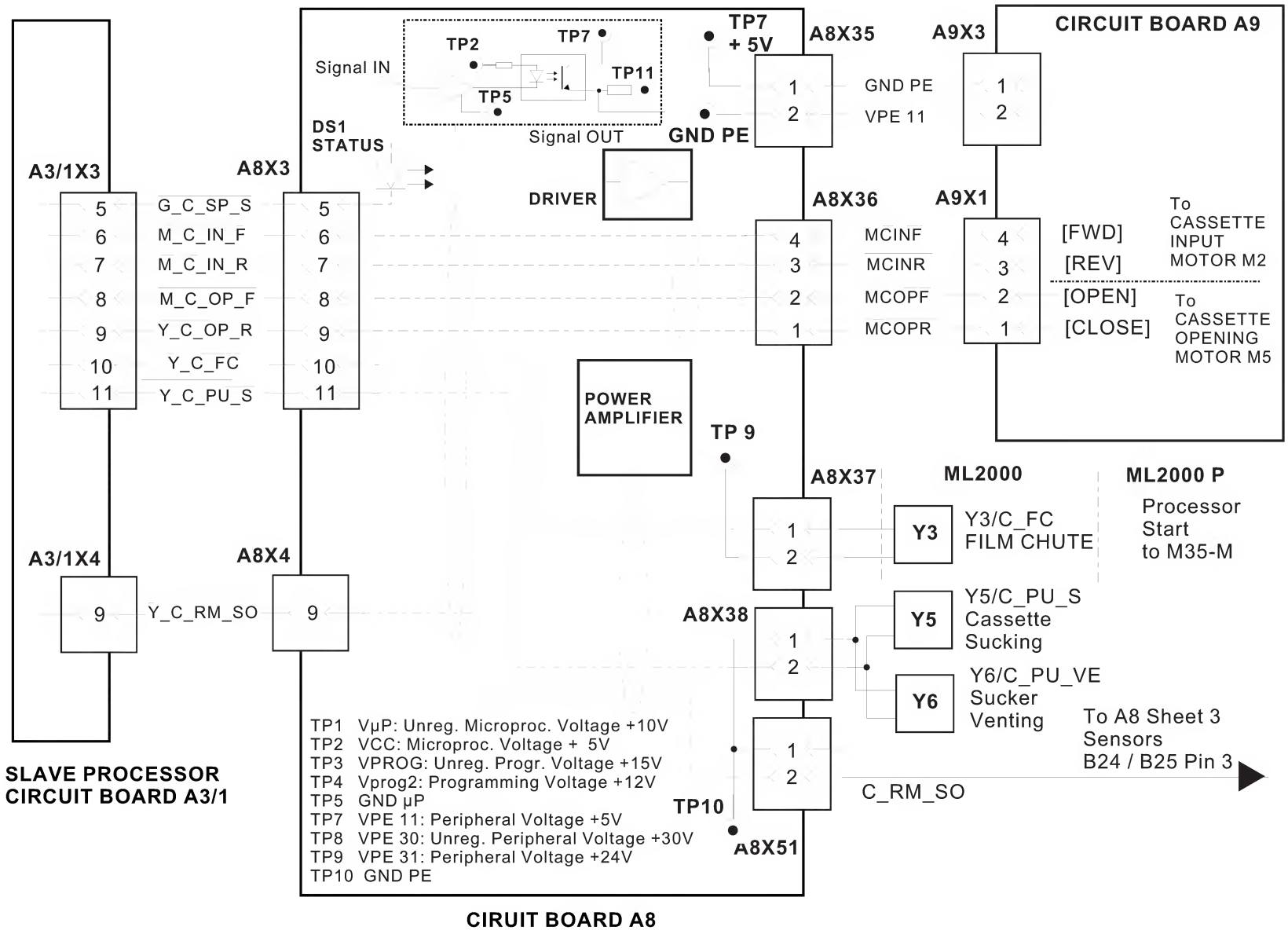
PCB A8 Mag. Interface
ML2000P Sheet 3 of 10



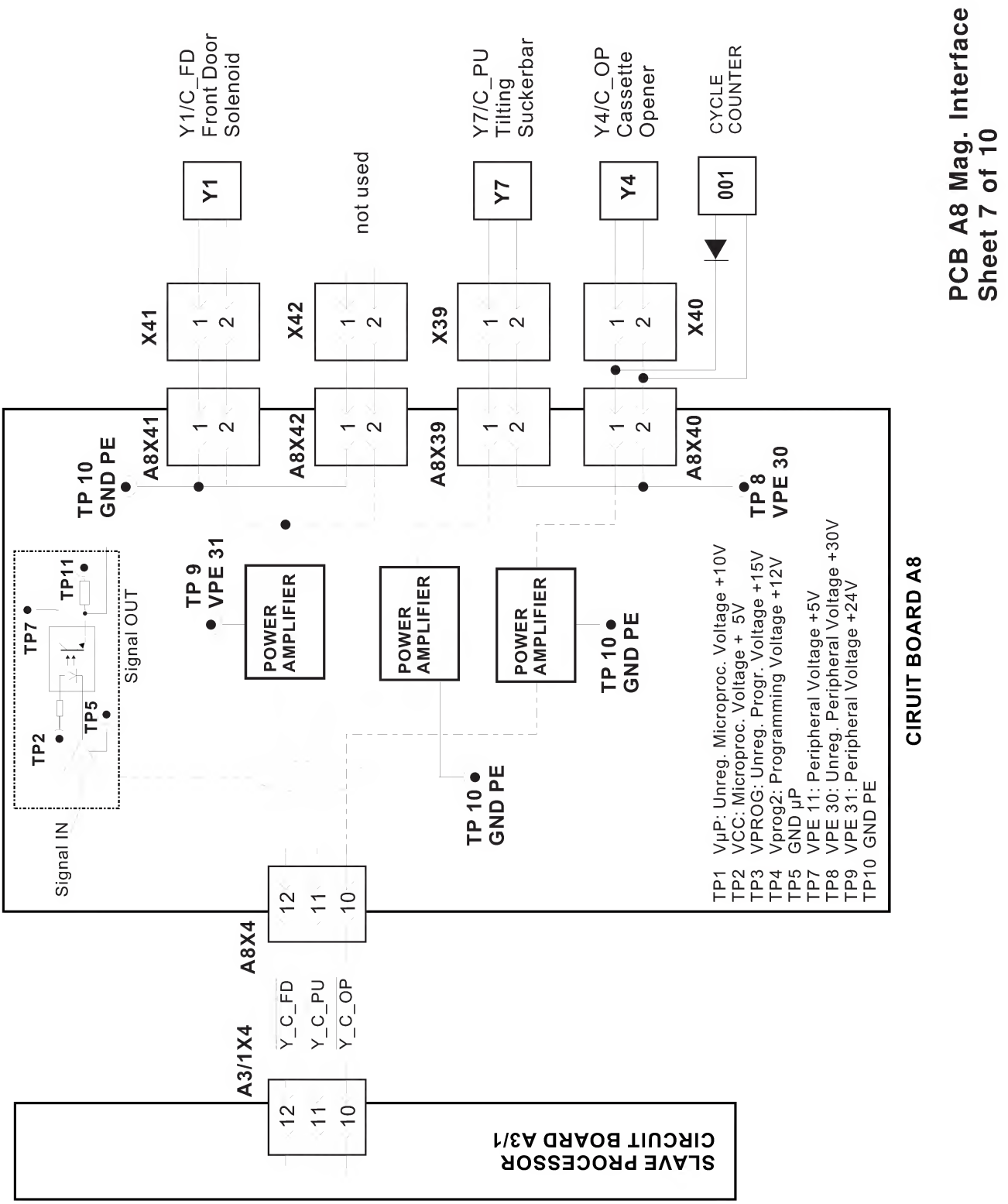
PCB A8 Mag. Interface
Sheet 4 of 10

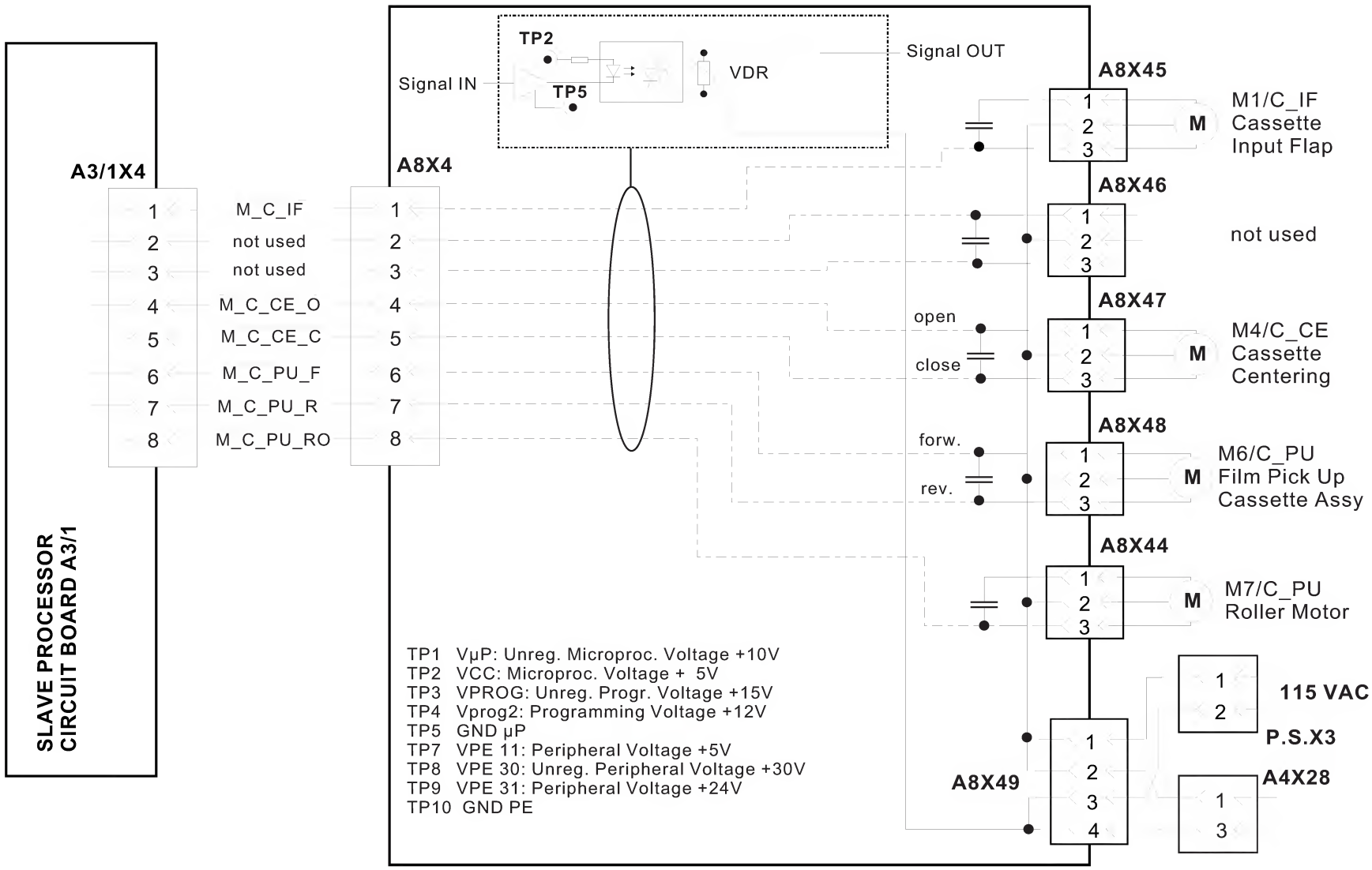


PCB A8 Mag. Interface
Sheet 5 of 10

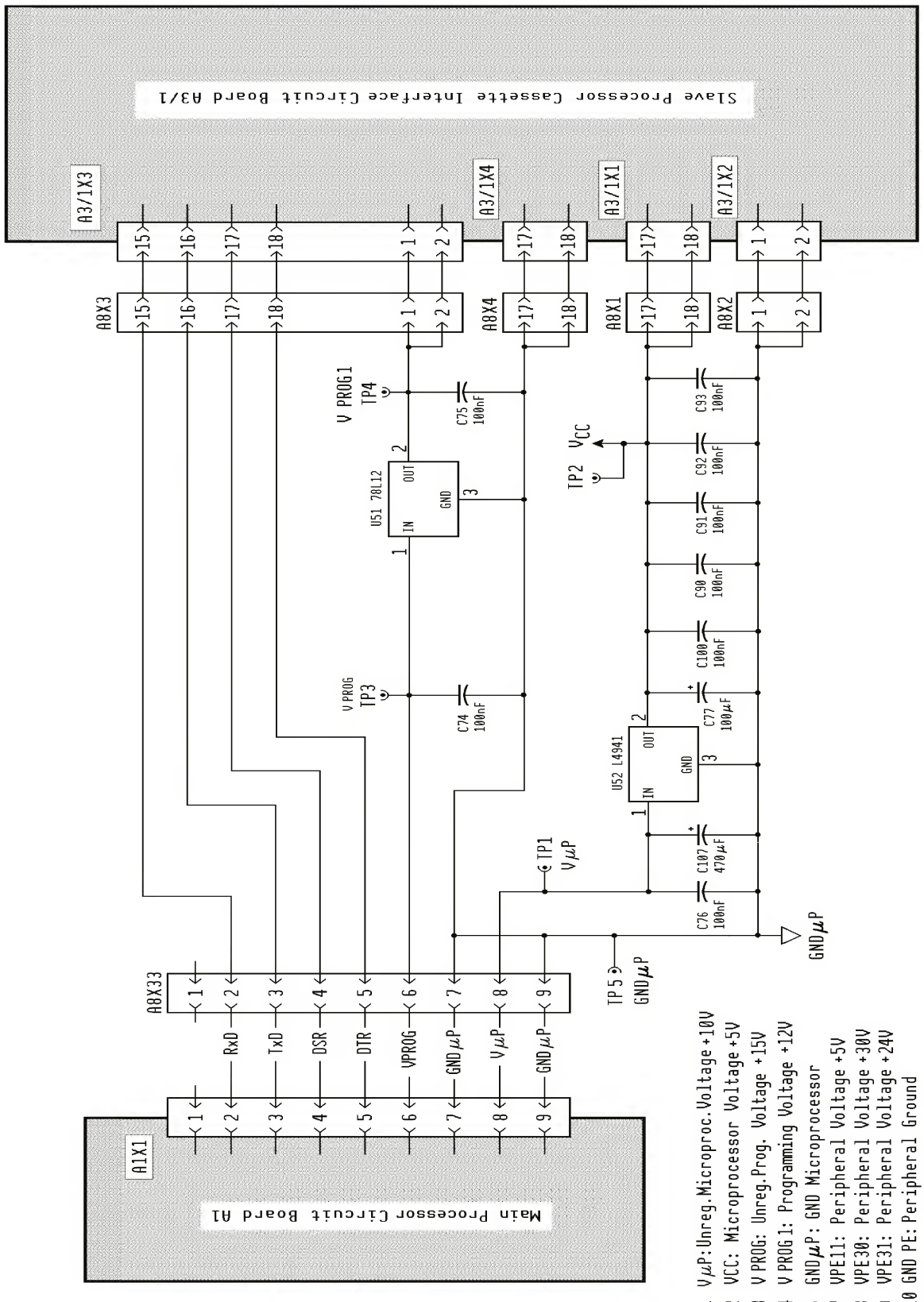


PCB A8 Mag. Interface
Sheet 6 of 10

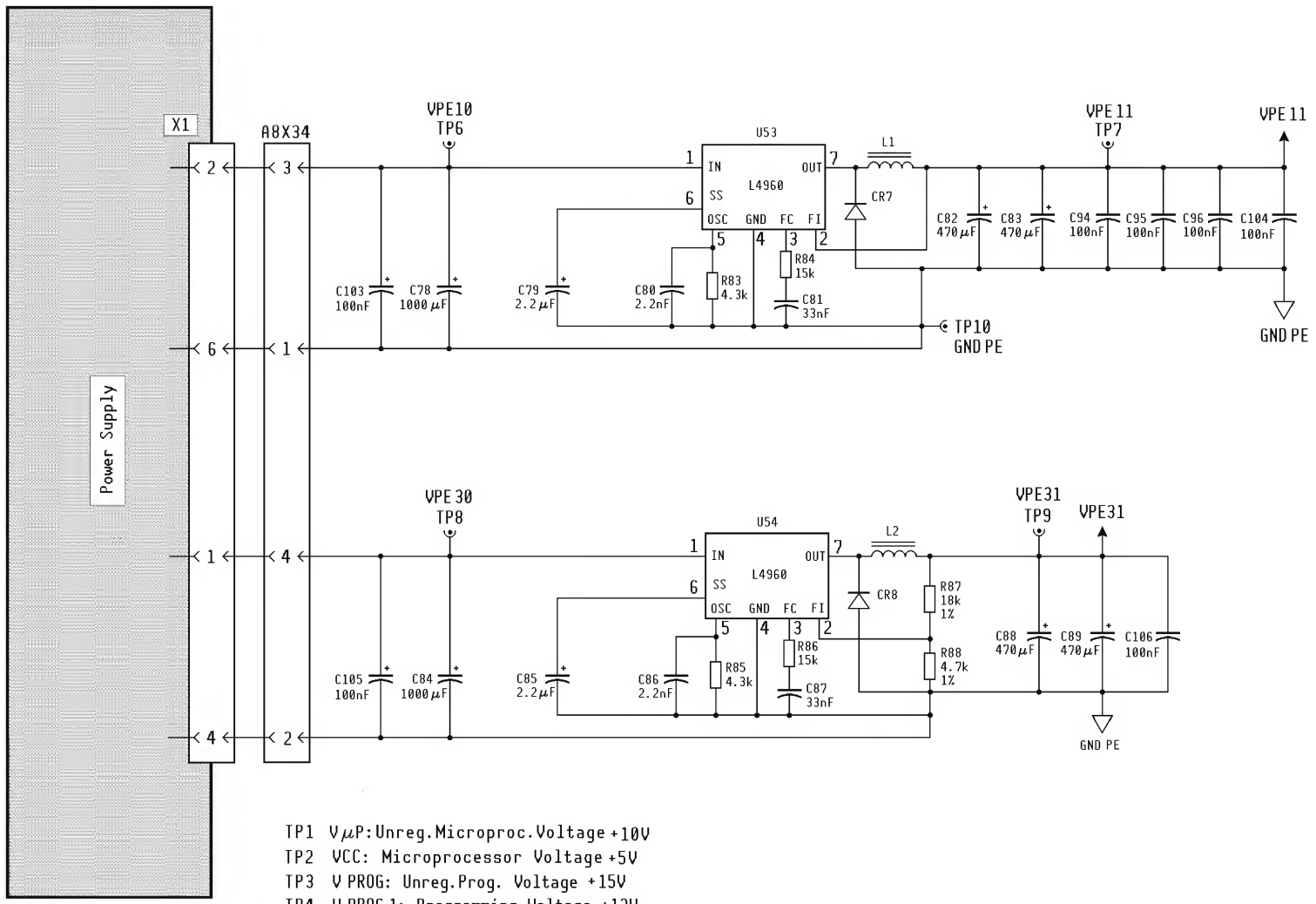

PCB A8 Mag. Interface
Sheet 7 of 10
CIRUIT BOARD A8
SLAVE PROCESSOR
CIRCUIT BOARD A3/1
A3/1X4
A8X4
Y_C_FD
Y_C_PU
Y_C_OP
Signal IN
Signal OUT
TP2
TP5
TP7
TP11
TP 10
GND PE
TP 9
VPE 31
POWER AMPLIFIER
POWER AMPLIFIER
POWER AMPLIFIER
TP 10
GND PE
TP 10
GND PE
TP 8
VPE 30
A8X41
A8X42
A8X39
A8X40
X41
X42
X39
X40
Y1
Y7
Y4
001
not used
Y1/C_FD
Front Door
Solenoid
Y7/C_PU
Tilting
Suckerbar
Y4/C_OP
Cassette
Opener
CYCLE
COUNTER
TP1 VµP: Unreg. Microproc. Voltage +10V
TP2 VCC: Microproc. Voltage + 5V
TP3 VPROG: Unreg. Progr. Voltage +15V
TP4 Vprog2: Programming Voltage +12V
TP5 GND µP
TP7 VPE 11: Peripheral Voltage +5V
TP8 VPE 30: Unreg. Peripheral Voltage +30V
TP9 VPE 31: Peripheral Voltage +24V
TP10 GND PE



PCB A8 Mag. Interface
Sheet 8 of 10



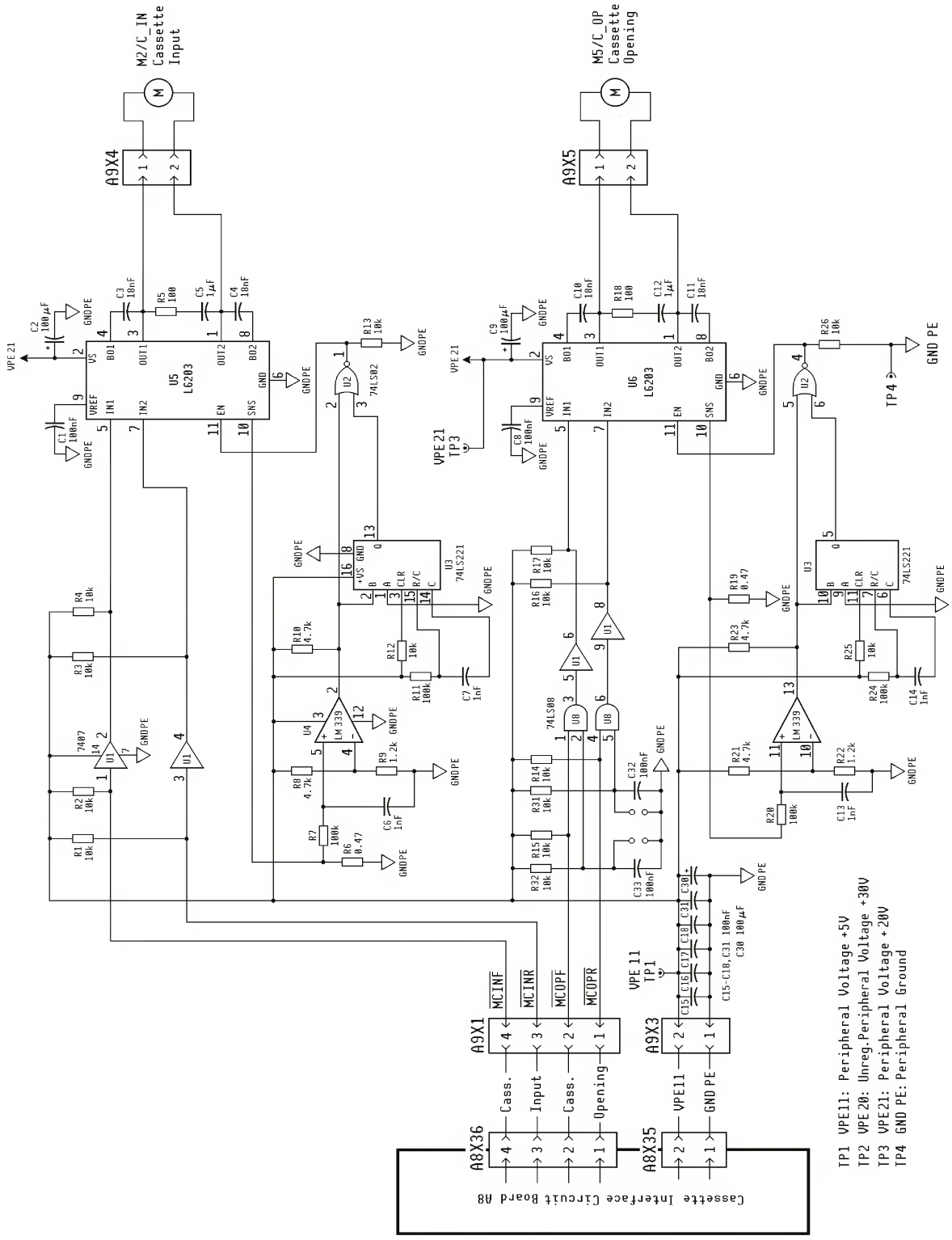
PCB A8 Mag. Interface
Sheet 9 of 10

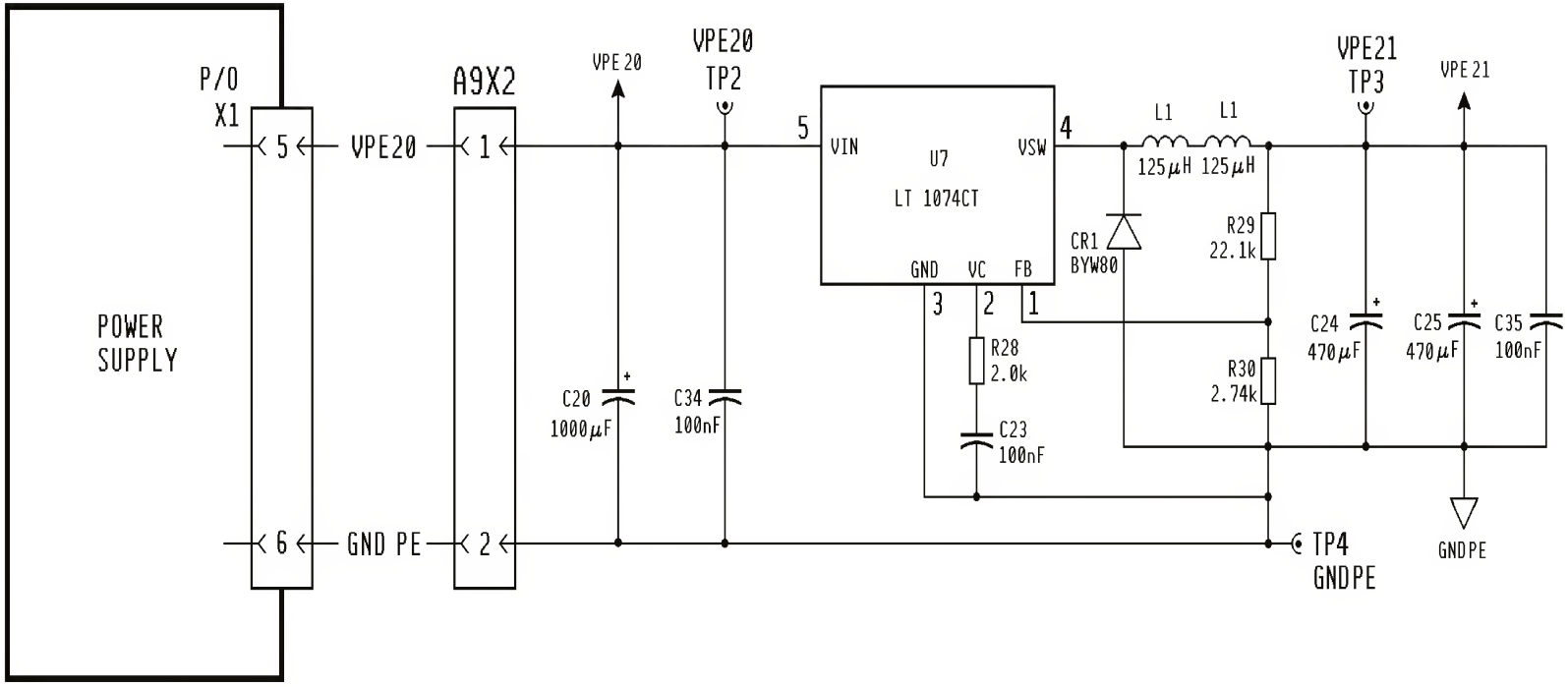


TP1 VµP: Unreg. Microproc. Voltage +10V
TP2 VCC: Microprocessor Voltage +5V
TP3 V PROG: Unreg. Prog. Voltage +15V
TP4 V PROG 1: Programming Voltage +12V
TP5 GNDµP: GND Microprocessor
TP7 VPE11: Peripheral Voltage +5V
TP8 VPE30: Peripheral Voltage +30V
TP9 VPE31: Peripheral Voltage +24V
TP10 GND PE: Peripheral Ground

PCB A8 Mag. Interface
Sheet 10 of 10

PCB A9 DC MOTOR DRIVE
Sheet 1 of 2

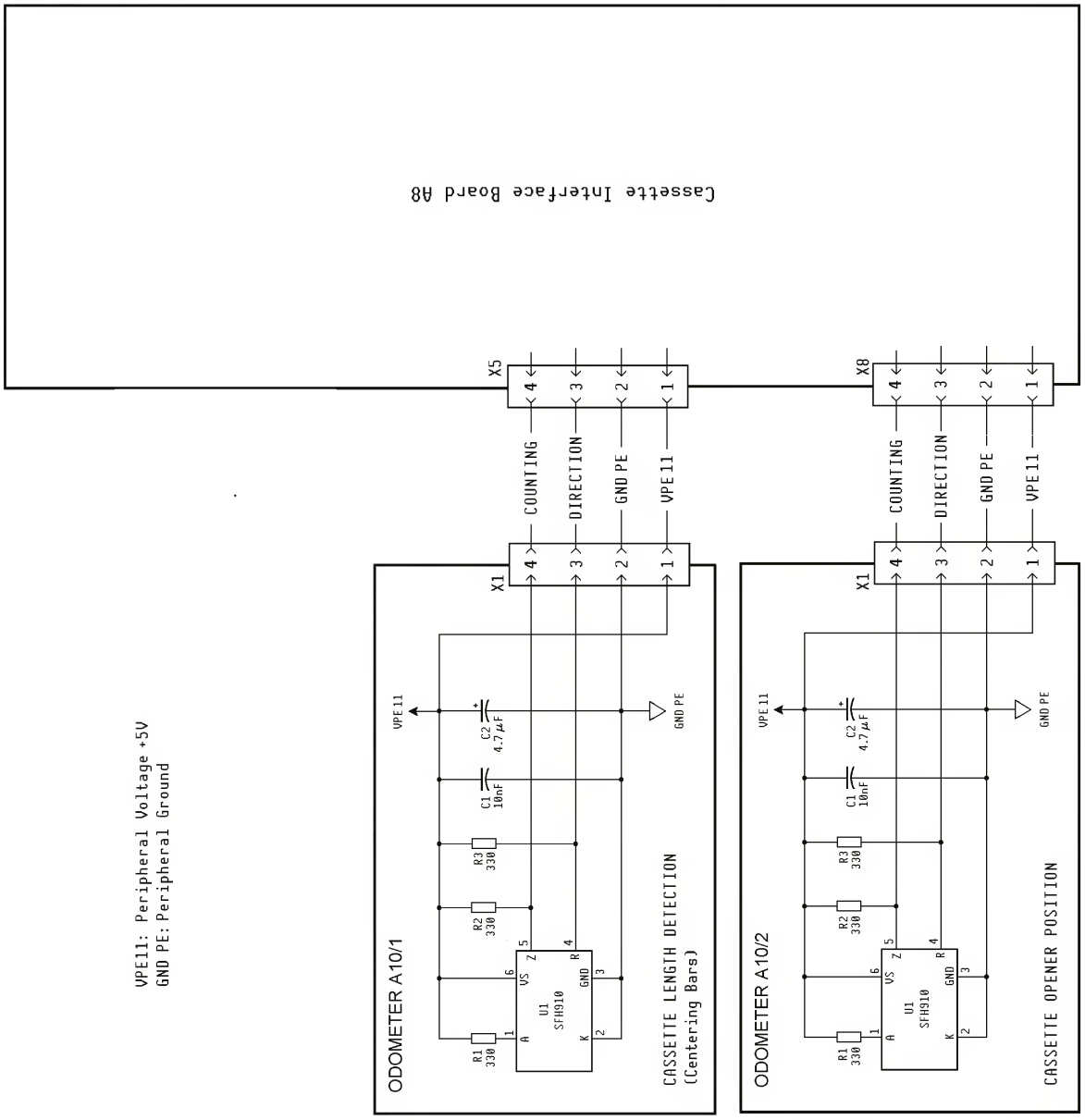


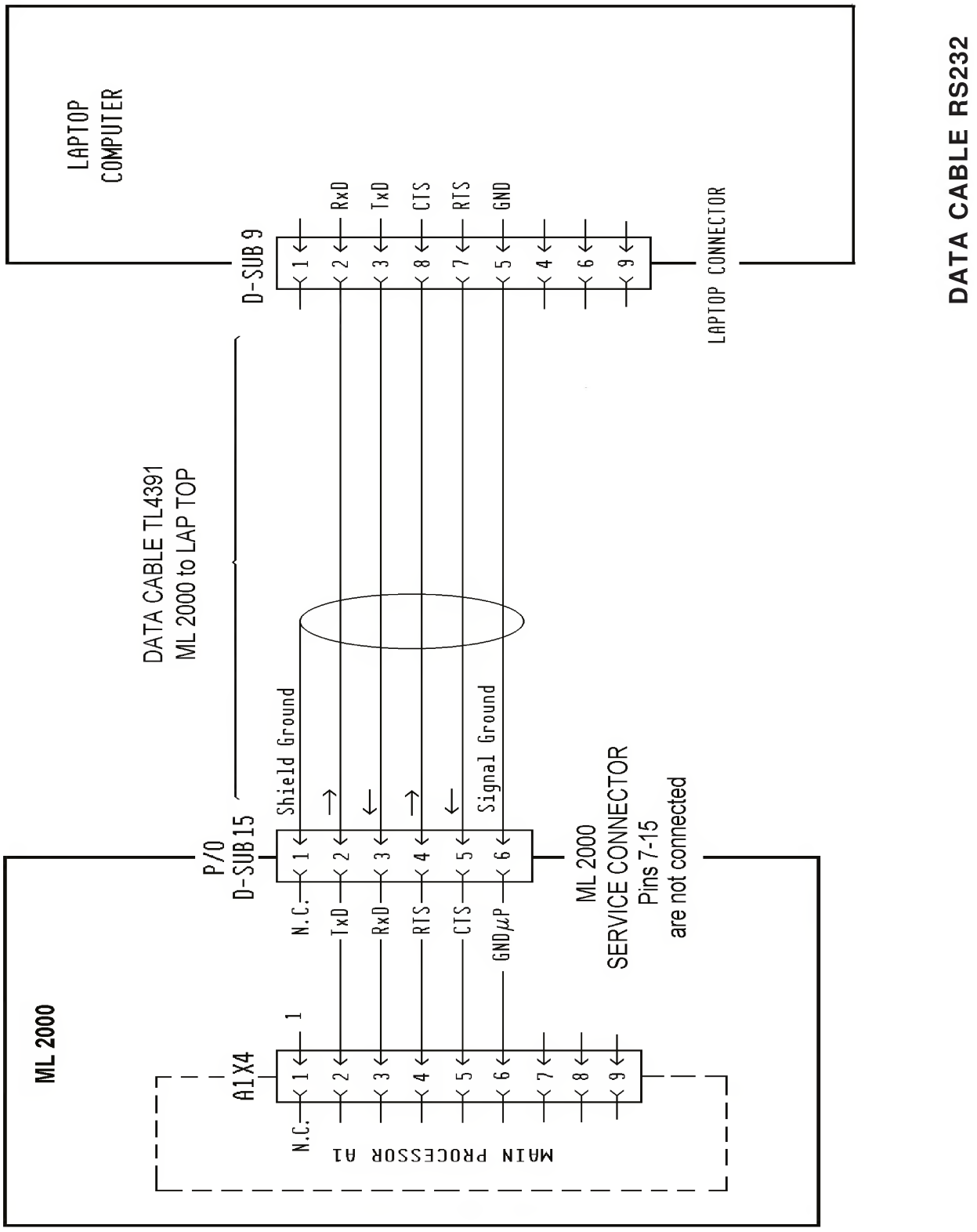


TP1 VPE11: Peripheral Voltage +5V
TP2 VPE 20: Unreg.Peripheral Voltage +30V
TP3 VPE21: Peripheral Voltage + 20V
TP4 GND PE: Peripheral Ground

PCB A9 DC MOTOR DRIVE
Sheet 2 of 2

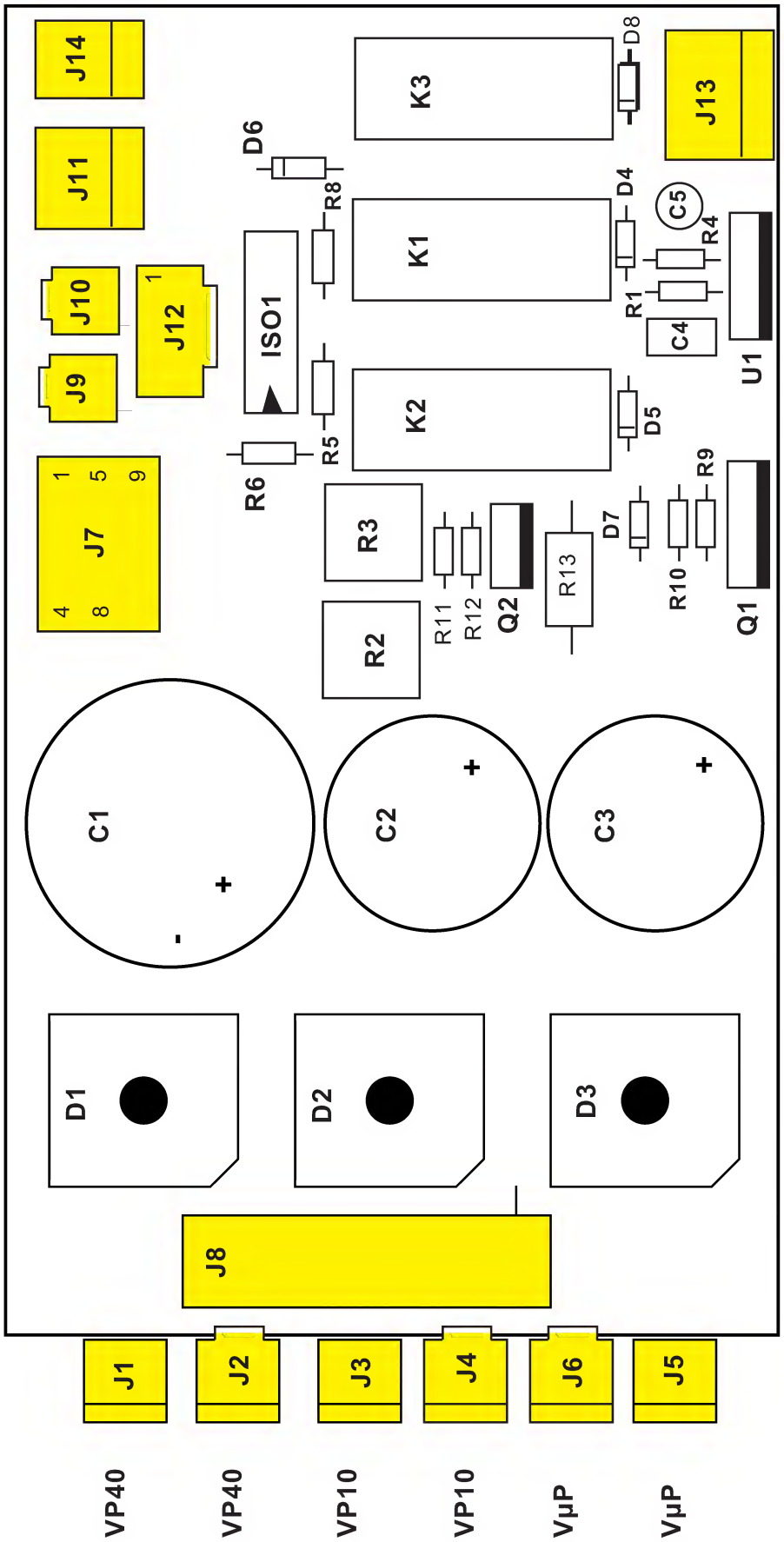
PCB A10/1 A10/2
ODOMETER

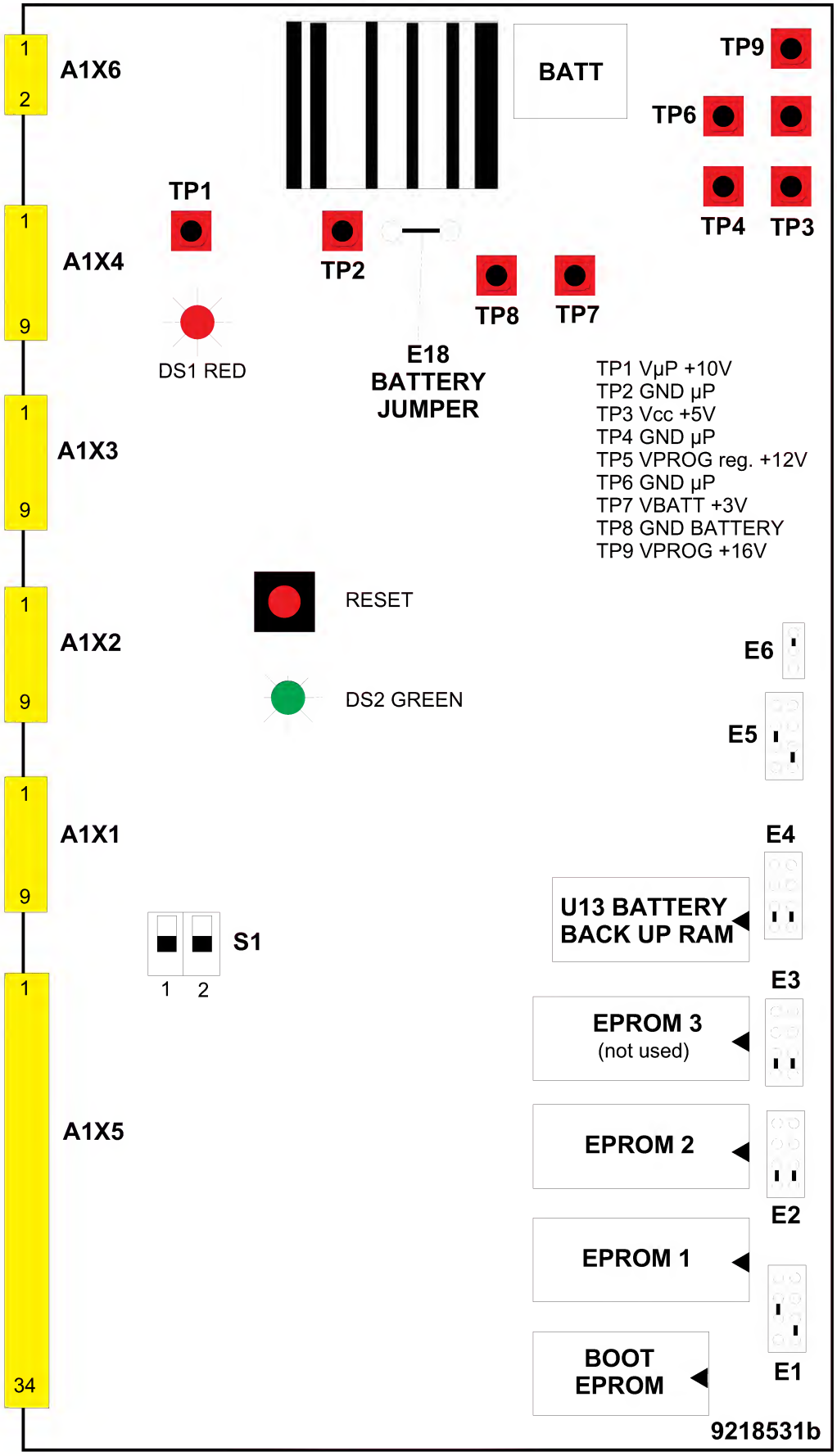



DATA CABLE RS232
LAPTOP COMPUTER
D-SUB 9
RxD
TxD
CTS
RTS
GND
LAPTOP CONNECTOR
DATA CABLE TL4391
ML 2000 to LAP TOP
Shield Ground
Signal Ground
P/O D-SUB 15
N.C.
TxD
RxD
RTS
CTS
GNDμP
ML 2000 SERVICE CONNECTOR
Pins 7-15
are not connected
ML 2000
A1X4
MAIN PROCESSOR A1

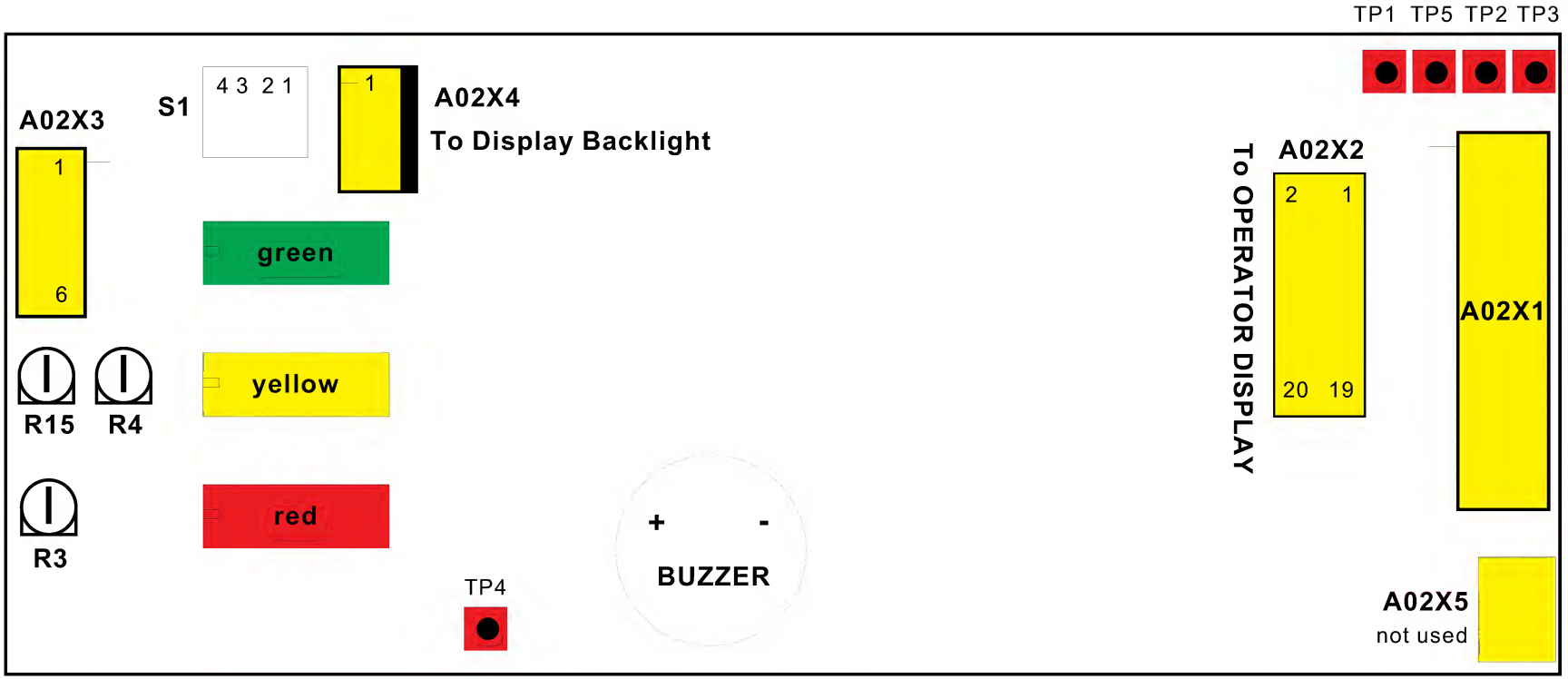
3. CIRCUIT BOARD LAYOUTS

PCB A0 POWER SUPPLY





PCB A1 MAIN PROCESSOR



R3 BACKLIGHT SWITCH OFF
R4 DISPLAY CONTRAST
R15 BUZZER VOLUME

TP1 = VCC +5V
TP2 = VµP +10V
TP3 = GND µP
TP4 = BACKLIGHT SUPPLY +4.7V
TP5 = Vee CONTRAST VOLTAGE -10V...-15V

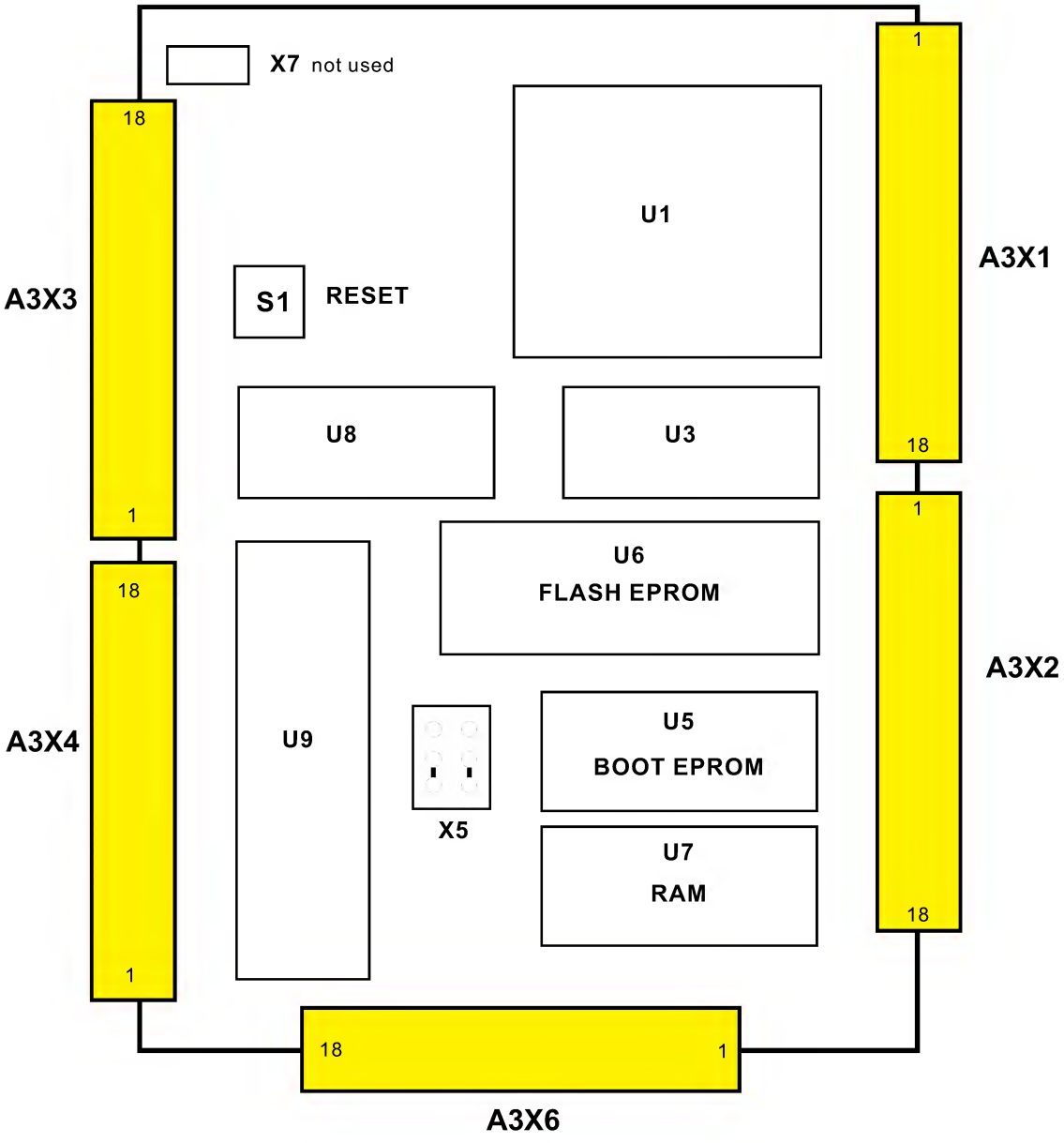
FACTORY SETTING SWITCH S1
S1-1 ON (ON-Board Contrast Poti)*
S1-2 OFF (40 Char / Line)*
S1-3 OFF (Black Characters)*
S1-4 ON (Backlight always on)

S1-4 OFF Backlight ON if roomlight > 120 Lux
Backlight OFF if roomlight < 30 Lux

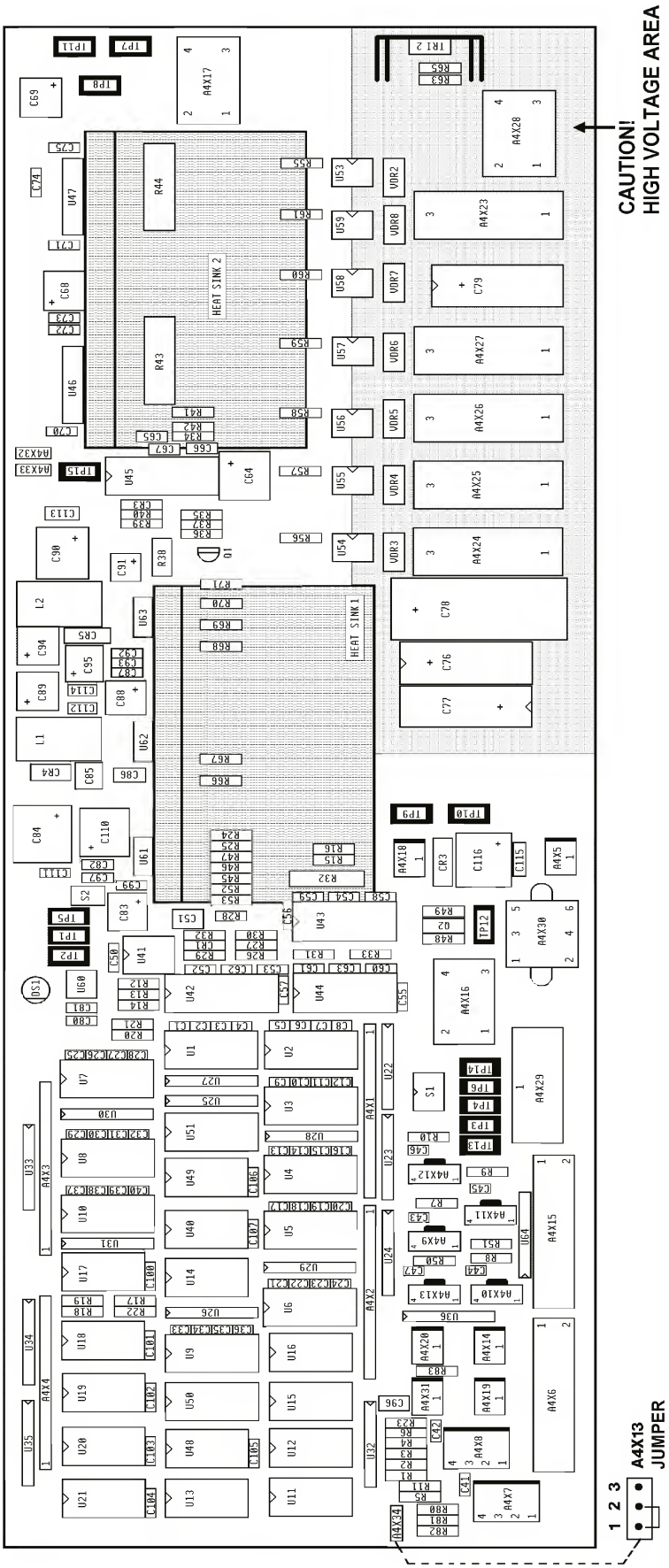
* Do not change the factory setting of S1-1, S1-2 and S1-3

PCB A2 OPERATOR INTERFACEE

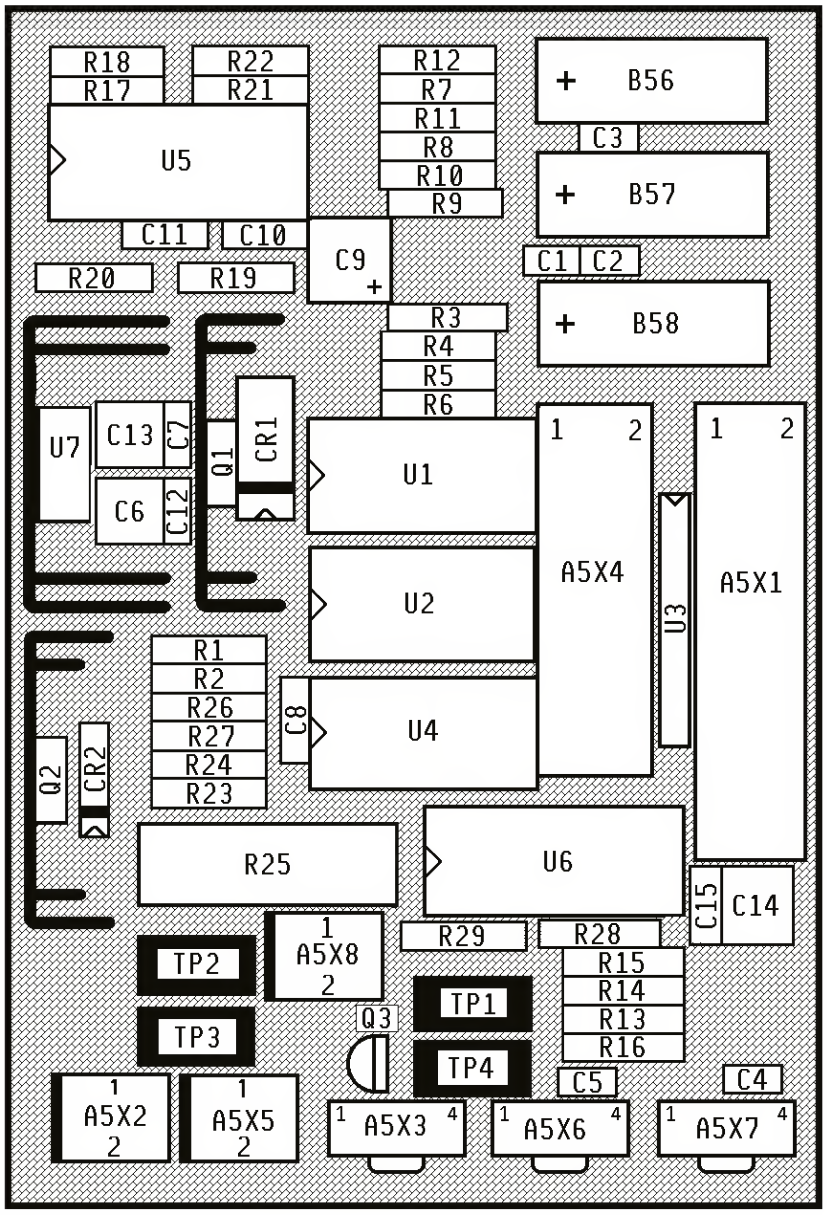
PCB A3 SLAVE PROCESSOR

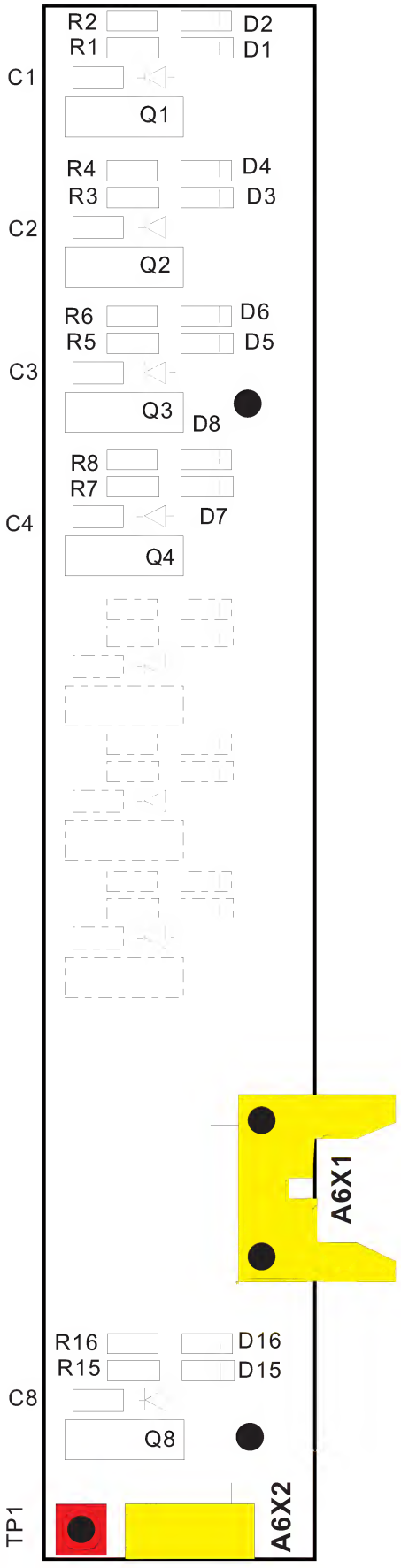


PCB A4 MAGAZINE



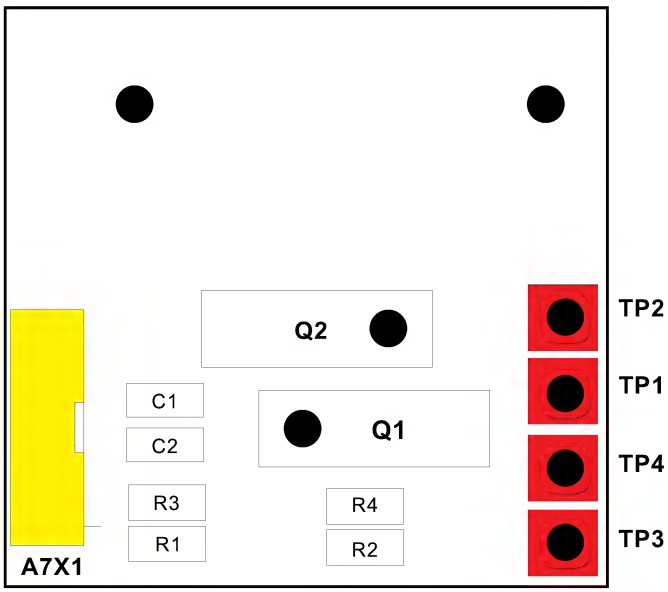
PCB A5 FILMPOCKET



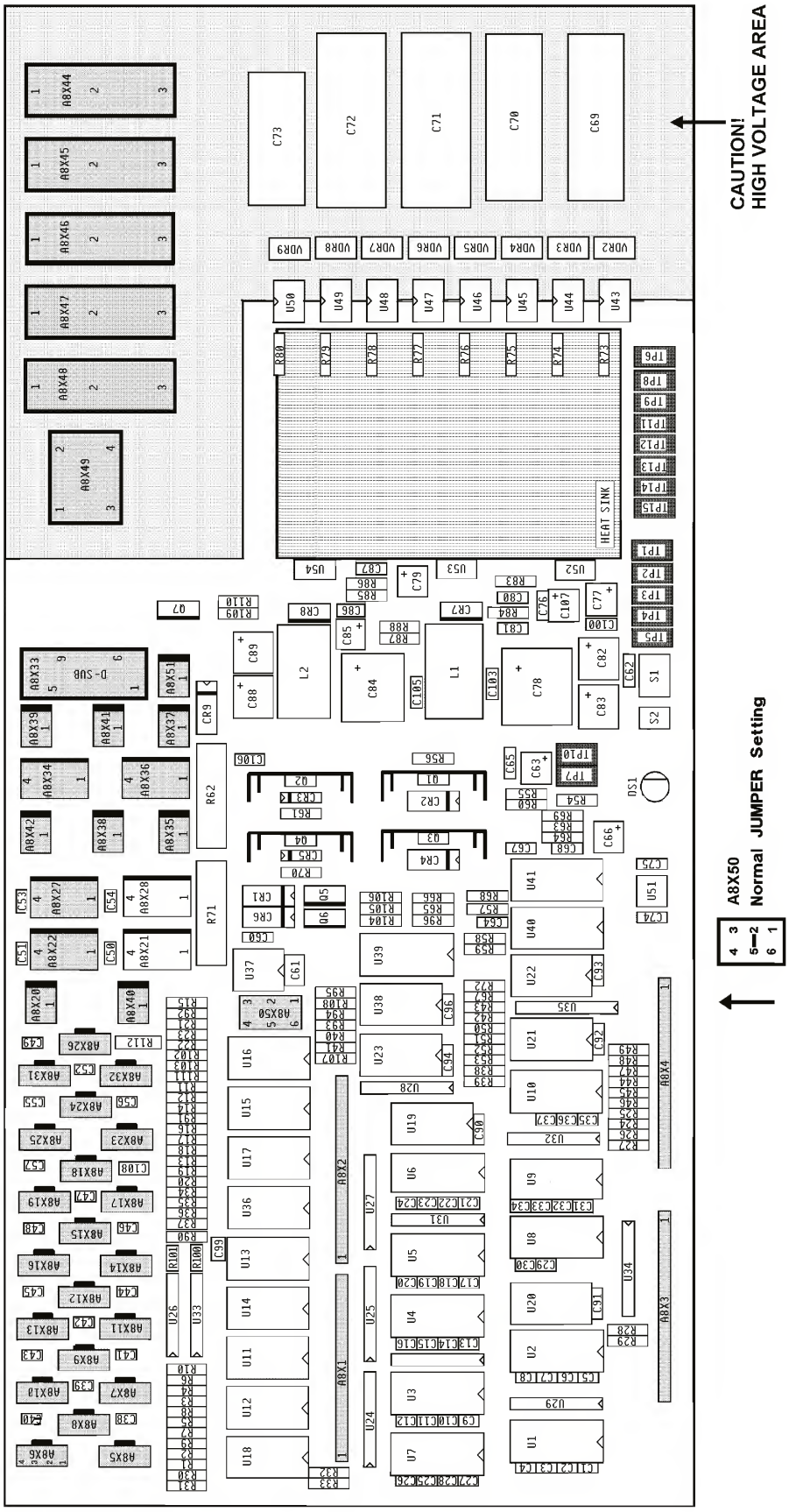


PCB A6 MAGAZINE SENSE

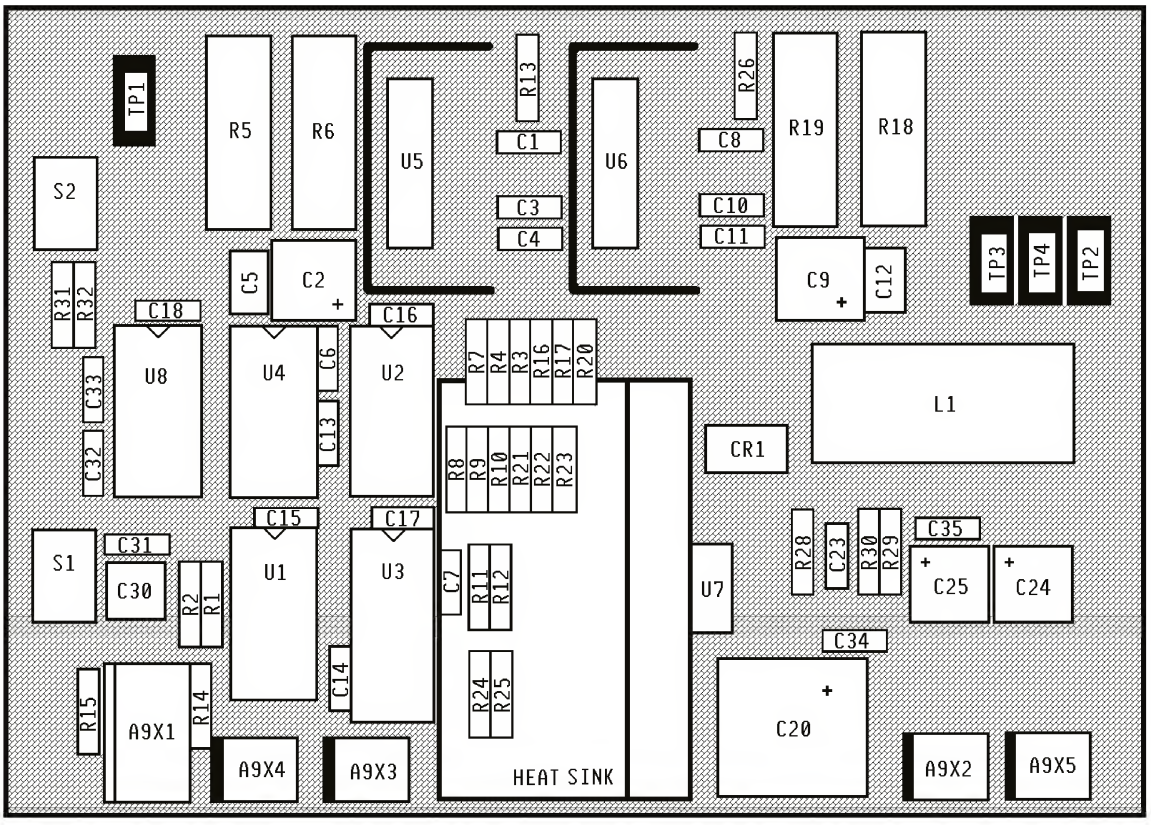
PCB A7 LEVEL CONTROL



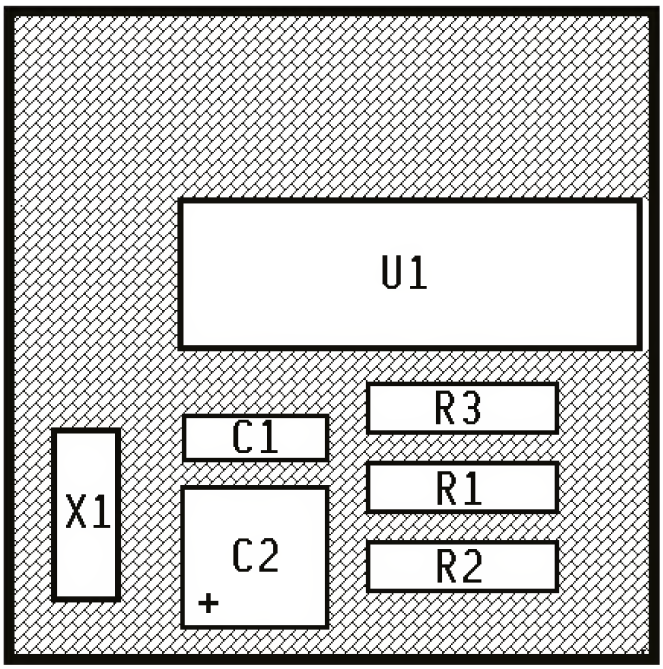
PCB A8 CASSETTE INTERFACE



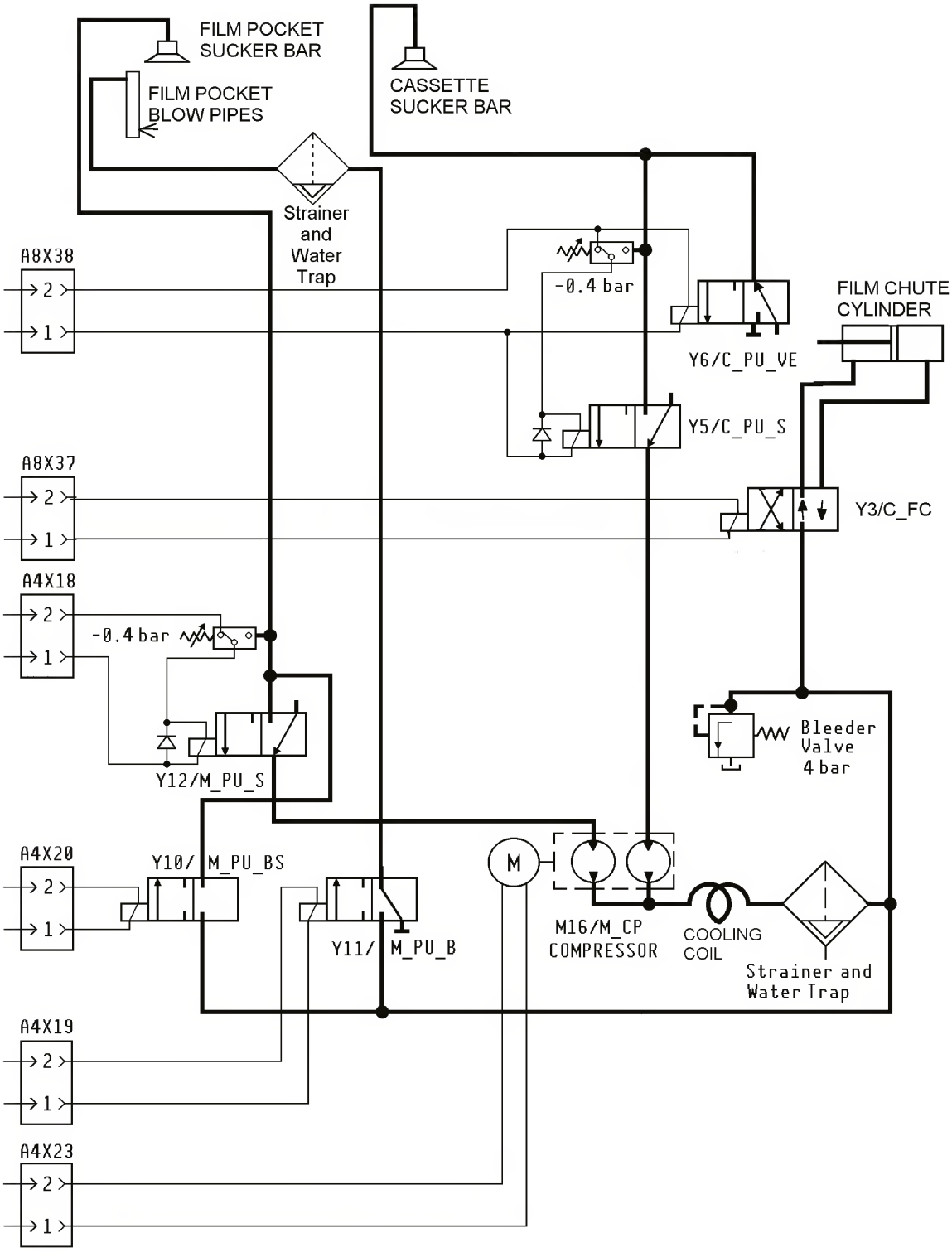
PCB A9 DC MOTOR DRIVER



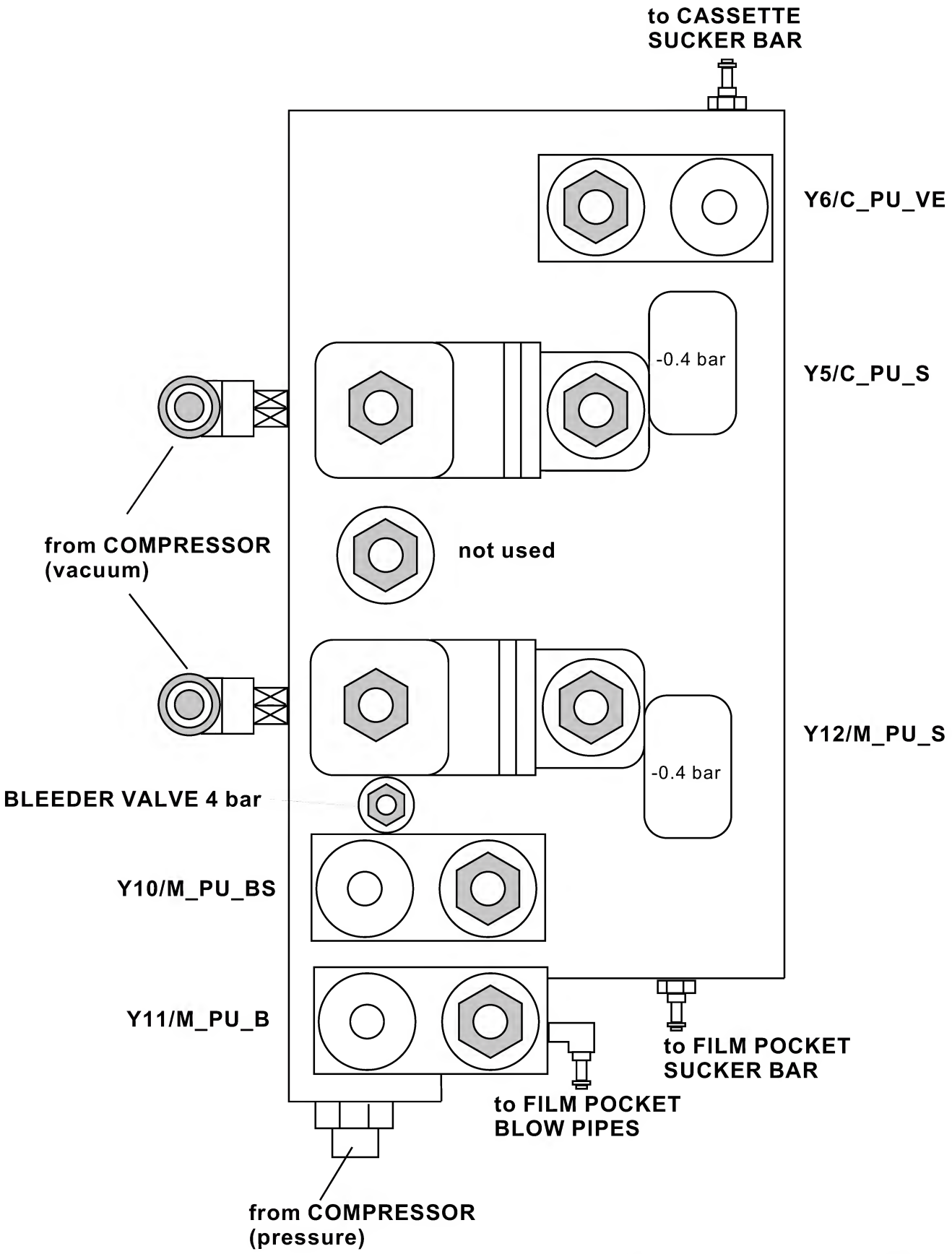
PCB A10 ODOMETER



4. PNEUMATIC


FILM POCKET SUCKER BAR
FILM POCKET BLOW PIPES
CASSETTE SUCKER BAR
Strainer and Water Trap
A8X38
2
1
-0.4 bar
FILM CHUTE CYLINDER
Y6/C_PU_VE
Y5/C_PU_S
A8X37
2
1
Y3/C_FC
A4X18
2
1
-0.4 bar
Y12/M_PU_S
Bleeder Valve 4 bar
A4X20
2
1
Y10/ M_PU_BS
Y11/ M_PU_B
M
M16/M_CP COMPRESSOR
COOLING COIL
Strainer and Water Trap
A4X19
2
1
A4X23
2
1

PNEUMATICS



PNEUMATIC VALVE ASSEMBLY

5. SIGNAL LIST

INPUT SIGNALS CASSETTE INTERFACE A3/1

FUNCTION CENTERING

SIGNAL NAME	SENSOR	PURPOSE
B_C_CE_C	B11/C_CE_CL CASSETTE CENTERED LEFT	The CASSETTE is centred when this signal is LOW. SENSORS "CASSETTE CENTERED LEFT" and "CASSETTE CENTERED RIGHT" are connected in line.
B_C_CE_C	B12/C_CE_CL CASSETTE CENTERED RIGHT	The CASSETTE is centred when this signal is LOW. SENSORS "CASSETTE CENTERED LEFT" and "CASETTE CENTERED RIGHT" are connected in line.
B_C_CE_EO	B10/C_CE_EO CENTERING BARS OPENED	This signal is LOW when the CENTERING BARS are in their outermost position.
B_C_CE_L0	B13/C_CE_L CASSETTE LENGTH DETECTION	The CENTERING BARS move in until they are stopped by the CASSETTE (SENSORS "CASSETTE CENTERED LEFT" and "CASSETTE CENTERED RIGHT" are actuated). The amount of pulses (generated by the ODOMETER PCB A10/2) on the signal is used to calculate the CASSETTE LENGTH.
B_C_CE_L1	B13/C_CE_L CASSETTE LENGTH DETECTION	The signal is LOW when the CENTERING BARS are moving out. The signal is HIGH when the CENTERING BARS are moving in.

FUNCTION FRONT DOOR

SIGNAL NAME	SENSOR	PURPOSE
B_C_FD	B1/C_FD FRONT DOOR SWITCH	The signal is LOW as long as the FRONT DOOR is closed.

FUNCTION INPUT FLAP

SIGNAL NAME	SENSOR	PURPOSE
B_C_IF_EC	B4/C_IN_EC CASSETTE INPUT FLAP CLOSED	The signal is LOW when the CASSETTE INPUT FLAP is closed.
B_C_IF_EO	B3/C_IN_EO CASSETTE INPUT FLAP OPEN	The signal is LOW when the CASSETTE INPUT FLAP is open.

FUNCTION CASSETTE INPUT

SIGNAL NAME	SENSOR	PURPOSE
B_C_IN_EM	B6/C_IN_EM CASSETTE IN ENDSWITCH MIDDLE	If the ENDSWITCH is actuated by a CASSETTE, the signal goes LOW. CENTERING is started.
B_C_IN_R	B2/C_IN_R CASSETTE REGISTRATION	The signal goes LOW when the CASSETTE actuates the SENSOR. When a CASSETTE is pushed in by the Operator, the cycle is started.

FUNCTION OPEN CASSETTE

SIGNAL NAME	SENSOR	PURPOSE
B_C_OP_P0	B14/C_OP_P CASSETTE OPENER POSITION	The ODOMETER PCB A12 generates pulses as long as the OPENER BRACKET moves up or down. The pulses are used to detect the LOWER-, the BLOW- and the HOME-POSITION of the OPENER BRACKET.
B_C_OP_P1	B14/C_OP_P CASSETTE OPENER POSITION	The signal is LOW when the OPENER BRACKET moves up. The signal is HIGH when the OPENER BRACKET moves down.
B_C_OP_EO	B15/C_OP_EO CASSETTE OPENER END SWICH OPEN	This signal is LOW when the CASSETTE OPENER is in the HOME POSITION.
B_C_OP_RO	B16/C_OP_RO CASSETTE REALLY OPEN	The signal is LOW when the CASSETTE is really open.

FUNCTION FILM PICKUP FROM CASSETTE

SIGNAL NAME	SENSOR	PURPOSE
B_C_PU_EF	B17/C_PU_EF CASSETTE FILM PICK UP FRONT	The signal is LOW when the CASSETTE SUCKER BAR ARRIAGE is in the FRONT POSITION.
B_C_PU_ER	B18/C_PU_ER CASSETTE FILM PICK UP REAR	The signal is HIGH when the CASSETTE SUCKER BAR CARRIAGE is in the REAR POSITION.
B_C_PU_T	B19/C_PU_T SUCKER BAR TILT	The signal is LOW when the CASSETTE SUCKER BAR is tilted. The signal is used as an indicator if the FILM in the CASSETTE is picked up or not by the CASSETTESUCKER BAR.

B_C_PU_VO	B20/C_PU_VO *VAC*UUM OFF	The FILM is picked up from the CASSETTE and transported into the CONVEYOR. As soon as it enters the CONVEYOR the SENSOR "VACUUM OFF" is actuated and the signal goes LOW. A short time later the vacuum is turned off to release the FILM from the SUCKERS.

FUNCTION RESET

SIGNAL NAME	SENSOR	PURPOSE
B_C_RESET	PCB A8 S1 RESET	When S1 is pressed the signal goes LOW. This resets the SLAVE PROCESSOR PCB A3/1.

FUNCTION INTERLOCK

SIGNAL NAME	SENSOR	PURPOSE
B_C_TC_I	B23/C_TCI TOP COVER INTERLOCK	The signal is LOW as long as the TOP COVER is closed

FUCTION RECEIVING MAGAZINE

SIGNAL NAME	SENSOR	PURPOSE
B_C_RM_E	B24/C_RM_E Receiving Magazine Entrance	This signal goes LOW if no FILM is in the MAGAZINE ENTRANCE.
B_C_RM_F	B25/C_RM_F Receiving Magazine Full	This signal goes HIGH if the RECEIVING MAGAZINE is full.

FUNCTION FILM CHUTE (ML2000 only)

SIGNAL NAME	SENSOR	PURPOSE
B_C_FC_O	B7/C_FC_O	This signal is LOW if the FILM CHUTE GUIDES are in the 18x24 position.
B_C_FC_C	B5/C_FC_C	This signal is LOW if the FILM CHUTE GUIDES are in the 24x30 position.

OUTPUT SIGNALS CASSETTE INTERFACE A3/1

FUNCTION CONTROL SIGNAL

SIGNAL NAME	DESTINATION	PURPOSE
$\overline{\text{G_C_SP_S}}$	PCB A8 DS1	This signal turns the red LED on PCB A8 on or off. **LED (red) is off** This may occur after power up only if a RAM-test failureis detected or the bootstrap-software is faulty. **LED (red) is blinking continuously** In this case only the bootstrap software is running. This happens during software load from the Lap Top. **LED (red) displays a rhythmic blinking** In this case a fatal error occurred. A “normal” error code will be displayed too. If the problem cannot be solved try to record the blinking hex error code and pass it on to your local specialist. The problem can then be analysed in the factory. For example the LED blinks as follows: The asterisks means the LED is on. * 0.5 sec pause * * * * * * * 1 sec pause * 0.5 sec pause * * * * * * * and so on. The 2 digit hex code for this example is 17

FUNCTION CASSETTE CENTERING

SIGNAL NAME	DESTINATION	PURPOSE
$\overline{\text{M_C_CE_C}}$	M4/C_CE CASSETTE CENTERING	When this signal goes LOW the CASSETTE CENTERING becomes closed.
$\overline{\text{M_C_CE_O}}$	M4/C_CE CASSETTE CENTERING	When this signal goes LOW the CASSETTE CENTERING becomes opened.

FUNCTION INPUT FLAP

SIGNAL NAME	DESTINATION	PURPOSE
$\overline{\text{M_C_IF}}$	M1/C_IF CASS. INPUT FLAP	A LOW turns on the MOTOR CASSETTE INPUT FLAP. To avoid FILM FOGGING this FLAP has to be closed when a CASSETTE is in the ML2000 / ML2000 P. The MOTOR turns only in one direction and is stopped by the SENSOR “CASSETTE INPUT FLAP OPEN” or “CASSETTE INPUT FLAP CLOSED".

FUNCTION CASSETTE INPUT

SIGNAL NAME	DESTINATION	PURPOSE
M_C_IN_F	M2/C_IN CASSETTE INPUT	The MOTOR CASSETTE INPUT is turned on in forward by a LOW. The CASSETTE is transported until the CASSETTE IN END SWITCH is actuated.
M_C_IN_R	M2/C_IN CASSETTE INPUT	The MOTOR CASSETTE INPUT is turned on in reverse by a LOW.

FUNCTION OPEN CASSETTE

SIGNAL NAME	DESTINATION	PURPOSE
M_C _OP_F	M5/C_OP CASSETTE OPENING	A LOW turns on the MOTOR CASSETTE OPENING and moves the OPENER BRACKET fully up. The MOTOR is turned off, after SENSOR "CASSETTE OPENER OPEN" is reached.
M_C_OP_R	M5/C_OP CASSETTE OPENING	A LOW turns on the MOTOR CASSETTE OPENING and moves the OPENER BRACKET fully down. The MOTOR is turned off after the correct amount of pulses is generated by the ODOMETER PCB A12. There is no END SWITCH for the LOWER OPENER BRACKET POSITION.
Y_C_OP	Y4/C_OP CASSETTE OPENER	A LOW energises the OPENER SOLENOID. The **SOLENOID is energised with maximum current and a short time later the current is reduced. This current control is done by IC U41.**

FUNCTION FILM PICKUP FROM CASSETTE

SIGNAL NAME	DESTINATION	PURPOSE
M_C_PU_F	M6/C_PU CASS. FILM PICK UP	The FILM PICK UP MOTOR is turned on in forward by a LOW. The MOTOR is turned off when the SENSOR "CASSETTE FILM PICK UP FRONT" is reached.
M_C_PU_R	M6/C_PU CASS. FILM PICK UP	The FILM PICK UP MOTOR is turned on in reverse by a LOW. The MOTOR is turned off when the SENSOR "CASSETTE FILM PICK UP REAR" is reached.
M_C_PU_RO	M7/C_PU_RO ROLLER MOTOR	The ROLLER MOTOR is in the CONVEYOR and transports the FILM to the FILM CHUTE. It is turned on by a LOW.

FUNCTION FRONT DOOR

SIGNAL NAME	DESTINATION	PURPOSE
$\overline{\text{Y_C_FD}}$	Y1/C_FD_L FRONT DOOR SOLENOID	A LOW energises the FRONT DOOR SOLENOID and the FRONT DOOR can be opened.

FILM PICKUP FROM CASSETTE

SIGNAL NAME	DESTINATION	PURPOSE
$\overline{\text{Y_C_PU}}$	Y7/C_PU TILTING SUCKER BAR	A LOW energises the TILT IN SUCKER BAR SOLENOID (WHITNEY MECHANISM). The SOLENOID is energised with maximum current and a short time later the current is reduced. This current control is done by IC U40.
$\overline{\text{Y_C_PU_S}}$	Y5/C_PU_S1 Y6/C_PU_S2 CASSETTE SUCKING	A LOW energises the CASSETTE SUCKING SOLENOID VALVE. The VACUUM is now built up in the SUCKERS and the FILM is picked up from the BOTTOM SCREEN of the CASSETTE.

FILM CHUTE (ML2000 only)

SIGNAL NAME	DESTINATION	PURPOSE
$\overline{\text{Y_C_FC}}$	Y3/C_FC FILM CHUTE	A LOW energises the FILM CHUTE SOLENOID VALVE Y3. The FILM CHUTE will go into the closed position at the beginning of a cycle. If the signal is HIGH the FILM CHUTE will go to the open position.

PROCESSOR (ML2000 P only)

SIGNAL NAME		PURPOSE
$\overline{\text{Proc. Interface}}$		This signal is provided by the M35-M Processor Interface. It enables the ML2000 P to unload a CASSETTE.
$\overline{\text{Proc. Start}}$		This signal is provided by the ML2000 P and starts the M35-M Processor.

ADDITIONAL ML2000P FUNCTIONS

Note

- SENSOR B26 is not retrofitable. It is factory installed only.
- The PROCESSOR READY KIT is an accessory. It is not factory installed.
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SIGNAL NAME		PURPOSE
$\overline{\text{C_CC}}$	**B26/C_CC CHUTE CLOSED**	This signal is provided if the ML2000P is rolled fully over the M35-M Processor.
C_PRON	From PROCESSOR READY KIT	This signal is provided if the M35-M Processoris switched ON.
C_PRDH	From PROCESSOR READY KIT	This signal is provided if the M35-M Processor has reached the set temperature.

INPUT SIGNALS MAGAZINE INTERFACE A3/2

FUNCTION MAGAZINE OPENING

SIGNAL NAME	SENSOR	PURPOSE
B_M_OP_EC	B37/M_OP_EC END SWITCH	The MAGAZINE OPENER is in the bottom position when this signal is LOW.
B_M_OP_EO	B36/M_OP_EO MAGAZINE OPENING SWITCH	The MAGAZINE OPENER is in the upper position when this signal is LOW. This means all three MAGAZINES are open.

FUNCTION FILMPOCKET POSITION

SIGNAL NAME	SENSOR	PURPOSE
B_M_PO_HP	B30/M_PO_HP HOME POSITION.	This signal is LOW when the FILMPOCKET is in the HOME POSITION. This position is close to MAGAZINE LEVEL 2. The FILMPOCKET is always parked here when in standby.
B_M_PO_ML	B32/M_PO_ML MAGAZINE LEVEL	This signal is LOW when the FILMPOCKET is at MAGAZINE LEVEL 1 or 2 or at CASSETTE LEVEL.
B_M_PO_DS	B59/M_PU_DS DOUBLE SHEET DETECTOR	This signal goes LOW when there is more than 1 FILM between the DETECTOR ROLLERS.

FUNCTION FILM PICKUP FROM MAGAZINE

SIGNAL NAME	SENSOR	PURPOSE
B_M_PU_E	B60/M_PU_E MAGAZINE EMPTY	This signal goes LOW when the selected MAGAZINE is found empty.
B_M_PU_EF	B56/M_PU_EF MAGAZINE FILM PICK UP END SWITCH FRONT	This signal goes LOW when the FILMPOCKET SUCKER BAR ARM is rotated to the fully upright position.
B_M_PU_ER	B58/M_PU_ER MAGAZINE FILM PICK SWITCH REAR	This signal goes LOW when the FILMPOCKET SUCKER BAR ARM is rotated fully out of the MAGAZINE and fully down.
B_M_PU_FS	B61/M_PU_FS FILM AT SUCKER BAR	This signal goes LOW when the MAGAZINE SUCKER BAR reaches the top FILM in the MAGAZINE. It stays LOW as long as a FILM is at the SUCKERS.
B_M_PU_M	B57/M_PU_M MAGAZINE FILM PICK UP MIDDLE POSITION	This signal goes LOW when the MAGAZINE SUCKER BAR is rotated out of the MAGAZINE and reaches an approximately horizontal position.

FUNCTION MAGAZINE SIZE DETECTION

SIGNAL NAME	SENSOR	PURPOSE
B_M_SD_B1 **B_M_SD_B2** **B_M_SD_B3** **B_M_SD_B4**	See SENSORS on PCB A6/1 A6/2	These signals are used to decode the MAGAZINE SIZE.
B_M_SD_CD	See SENSORS on PCB A6/1 A6/2	This signal is used to detect if the selected MAGAZINE is closed.

FUNCTION RECEIVING MAGAZINE

SIGNAL NAME	SENSOR	PURPOSE
B_M_RM_P	**B33/M_RM_P RECEIVING MAGAZINE PRESENT**	This signal is LOW when the RECEIVING MAGAZINE is inserted correctly.
B_M_RM_C	B34/_M_RM_C RECEIVING MAGAZINE CODE	LOW = 24x30 cm HIGH = 18x24 cm

OUTPUT SIGNAL MAGAZINE INTERFACE A3/2

FUNCTION FILM PICKUP FROM MAGAZINE

SIGNAL NAME	DESTINATION	PURPOSE
$\overline{\text{G_M_PU_E}}$	B60/M_PU_E MAGAZINE EMPTY SENSOR	This signal is used to turn on and off the MAGAZINE EMPTY SENSOR. The SENSOR is pulsed to avoid FILM FOGGING. This signal turns the red LED on PCB A8 on or off.

FUNCTION MAGAZINE SIZE DETECTION

SIGNAL NAME	DESTINATION	PURPOSE
$\overline{\text{G_M_SD_L1}}$ $\overline{\text{G_M_SD_L2}}$	PCB A6/1	These signals are the SELECT LINES for the two MAGAZINE SENSE BOARDS. They are not LOW at the same time.

FUNCTION CONTROL SIGNAL

SIGNAL NAME	DESTINATION	PURPOSE
$\overline{\text{G_M_SP_S}}$	DS1 on PCB A4	This signal turns the red LED on PCB A4 on or off. **LED (red) is off** This may occur after power up only if a RAM-test failure is detected or the bootstrap-software is faulty. **LED (red) is blinking continuously** In this case only the bootstrap software is running. This happens during software load from the Lap Top. **LED (red) displays a rhythmic blinking** In this case a fatal error occurred. A “normal” error code will be displayed too. If the problem cannot be solved try to record the blinking hex error code and pass it on to your local specialist. The problem can then be analysed in the factory. For example the LED blinks as follows: The asterisks means the LED is on. * 0.5 sec pause * * * * * * * 1 sec pause * 0.5 sec pause * * * * * * * and so on. The 2 digit hex code for this example is 17

FUNCTION COMPRESSOR

SIGNAL NAME	DESTINATION	PURPOSE
M_M_CP	M16/M_CP COMPRESSOR	If this signal goes LOW the COMPRESSOR is turned on. The COMPRESSOR is used to generate pressure and vacuum.

FUNCTION MAGAZINE OPENING

SIGNAL NAME	DESTINATION	PURPOSE
M_M_OP_C	M14/M_OP MAGAZINE OPENER	If this signal goes LOW the MAGAZINE OPENER MOTOR is turned on to close all three MAGAZINES.
M_M_OP_O	M14/M_OP MAGAZINE OPENER	If this signal goes LOW the MAGAZINE OPENER MOTOR is turned on to open all three MAGAZINES.

FUNCTION FILM PICKUP FROM MAGAZINE

SIGNAL NAME	DESTINATION	PURPOSE
M_M_PU_F	M15/M_PU PICKUP MAGAZINE	When this signal is LOW MOTOR M15 is turned on forward and the MAGAZINE SUCKER BAR is rotated into the MAGAZINE.
M_M_PU_R	M15/M_PU FILM PICKUP MAGAZINE	When this signal is LOW MOTOR M15 is turned on in reverse and the MAGAZINE SUCKER BAR is rotated out of the MAGAZINE.
Y_M_PU	PCB A5 U5	When this signal is LOW the SOLENOID Y14/PU MAGAZINE SUCKER BAR TILTING is energised.
Y_M_PU_B	Y11/M_PU_B MAGAZINE BLOWING	When this signal is LOW, SOLENOID VALVE Y11 is energised and air is blown into the MAGAZINE to separate the FILMS.
Y_M_PU_BS	Y10/M_PU_BS MAGAZINE BLOW INTO SUCKERS	When this SIGNAL is LOW SOLENOID VALVE Y10 is energised and air is blown into the SUCKERS of the MAGAZINE SUCKER BAR, to separate the FILM from the SUCKERS, when the FILM is put into the CASSETTE.
Y_M_PU_DS	Y15/M_PU_DS DOUBLE SHEET DETECTOR	When this signal is LOW SOLENOID Y15 is energised and the spring loaded DOUBLE SHEET DETECTOR ASSY moves forward to the MAGAZINE.
Y_M_PU_S	Y12/M_PU_S MAGAZINE SUCKING	When this signal is LOW SOLENOID VALVE Y12 is energised. Vacuum can now be built up in the MAGAZINE SUCKERS to pick up a fresh FILM.

FUNCTION FILM TRANSPORT INTO RECEIVING MAGAZINE

SIGNAL NAME	DESTINATION	PURPOSE
$\overline{\text{M_M_E}}$	M13/M_I STEPPER MOTOR INTERFACE	A LOW is the ENABLE SIGNAL for the STEPPER MOTOR CONTROL on PCB A4 sheet 4.
$\overline{\text{M_M_I_RE}}$	M13/M_I STEPPER MOTOR INTERFACE	A LOW is the RESET SIGNAL for the STEPPER MOTOR CONTROL on PCB A4 sheet 4.
$\overline{\text{M_M_I_ST}}$	M13/M_I STEPPER MOTOR INTERFACE	This is the SEP SIGNAL for MOTOR M13. The signal is amplified by the STEPPER MOTOR CONTROL on PCB A4 sheet 4 and converted into the 4 PHASE SIGNALS required by the STEPPER MOTOR.

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